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The AUTOMOBILE

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In 1920 as in all previous years The Chicago Tribune has maintained its lead in automotive advertising. In the first ten months of this year The Tribune has run almost twice as much copy of this nature as the next paper (an evening paper), and more than two and one-half times as much as the other morning paper.

Paper	Lineage
TRIBUNE	**1,430,211**
Herald-Examiner	**564,057**
News	**718,429**
Post	**700,926**
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Journal	**283,900**

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in the best automotive market

the five states of Illinois, Indiana, Iowa, Michigan and Wisconsin—one-eleventh of the area of the United States, with one-sixth of the national population which has one-fifth of the wealth and owns one-sixth of the national total of motor vehicles. This best market is accessible through a single medium—The Chicago Tribune.

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THE CHICAGO SHOW

January 29th to February 5th

and

THE CHICAGO TRIBUNE

January 29th to February 5th

and all the rest of the year

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The Chicago Show draws business from the whole Middle West—more dealers, more prospects—than the shows of any other city. Representation in The Tribune is especially desirable, and profitable, during show week. The Tribune tells your sales story to *able-to-buy* prospects at a time when they can *see* your product.

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Annual Passenger Car Issue
Annual Motor Truck Issue

SUNDAY, JANUARY THIRTIETH

The Chicago Tribune

THE WORLD'S GREATEST NEWSPAPER

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLIII NEW YORK—THURSDAY, DECEMBER 16, 1920 No. 25

Railroad Officials Recognize Truck as Transportation Ally

Trucks are needed to supplement railroads, asserts Daniel Willard. Chief Engineer of Rock Island predicts that truck lines will supersede branch railways.

A SWEEPING endorsement of automotive vehicles as transportation units was heard last week by the members of the Society of Mechanical Engineers at the annual meeting in this city. This endorsement could not have been better developed than it was, had this been the express object of the meeting. It all came about in the transportation sectional meeting.

First, Daniel Willard, president of the Baltimore & Ohio Railroad, declared that, while automotive vehicles could not compete with the railroads in long hauls, that they should be used for transportation in short haul traffic and in sparsely settled communities.

Second, Charles A. Morse, chief engineer of the Chicago, Rock Island & Pacific Railroad, told from the engineers' viewpoint how automotive vehicles should be used by the railroads as feeders.

Third, Francis W. Davis, consulting engineer of the truck department of the Pierce-Arrow Motor Car Co., and chairman of the Committee on the Science of Truck Operation of the Society of Automotive Engineers and that society's representative on the Automotive Conference Committee of the National Highway Educational Conference, read an illuminative paper on truck operation as it affects the public.

Willard's reference to the truck was brief, but it contained a message that the automotive industry will be very pleased to hear. It presented a railroad official's view that the motor truck is certain to become the ally of the railroad and that the two means of transportation will reach their best efficiency by working together. The best use of the two transportation agents does not conflict, according to Willard.

This is an especially strong endorsement, as Willard is considered as representing the best thought among the higher railroad authorities.

Morse presented a more intimate picture of the same viewpoint, as he went into considerable detail. Roughly speaking, the picture he drew was that of a railroad running through an agricultural region and serving a strip of territory about 100 miles wide, the truck lines radiating fanlike from this railroad to gather the materials to be shipped on the railroads to the warehouse or marketing center. An extract from this presentation follows:

Why Duplicate Lines?

"The public is paying for the good roads, they own the automobiles and motor cars, and now, under the Transportation Act, they must pay for the maintenance and operation, and also the interest on the value of the branch lines of railroads. In many localities the passenger travel on the railroads, especially on slow branch line trains, has been reduced 50 per cent to 75 per cent, due to the automobile.

"The public are going to be required to pay heavy taxes to cover cost of construction and upkeep of their good roads. Why should they, in addition to this, be obliged to pay in railroad rates the cost of upkeep, operation and interest on the cost of a branch line of railroad which they do not need, as with a good hard surfaced road and no branch line of rail-

road, some one would operate a motor bus for passengers and motor express for less than carload freight?

"A careful study should be made of branch lines of railroads, and where there are 'good roads' of the hard surfaced class, over which the business now handled by the railroad can be handled by motor trucks and buses, the matter of dismantling the branch line of railroad should be given serious consideration.

"The cost per ton-mile for transporting freight and the cost per passenger-mile on the short branch lines, are far more than the amount received by the railroad, the result being that the revenue from main line business must be enough to pay for its cost, and, in addition, must cover the deficit on the operation of the branch lines.

"If many of these lines that are tributary to a territory within the limits of motor bus and motor truck service could be taken up and abandoned, it would mean a reduction in the cost of main line service. Every large railroad has many branches of this kind which are simply feeders, and do not reach any large towns or connect with any other railroad, which could be taken up with economy to the public.

The Rate Problem

"Where branch lines are so long that they can not be replaced with motor service, and do not connect with or cross other railroads, there should be a rate on the branch that would yield an amount sufficient to cover cost of upkeep and operation, and to pay the required return on the value of the line, as by this means the main line rates could be reduced. There is no reason why the public at large should be required to pay an increased rate to provide cheap rates, cheaper than cost to produce, on a branch line to accommodate a few people. This is discrimination against the many in favor of the few, but it is one of the things that has been going on in this country for years.

"In considering the question of abandoning a branch line, the first question that comes to the mind of the railroad man is, how about the capital charge? Capital account would have to be credited with the book value of the line abandoned, and operation charged with the same, less salvage; but this could be saved in direct outlay in a period of about five years, and should be distributed over such a period.

"Branch lines are a necessity, and it should not be understood that any attempt is being made to belittle their importance; but the transformation that is constantly going on in large cities in connection with suburban train service, by which stations near the center of the city are abandoned, due to rapid transit on elevated railroads or subways, furnishing as good or better facilities, is also taking place where short branch lines are being operated, where the business can be taken care of as well, if not better, by motor cars on hard surfaced wagon roads."

Need of a Change

An interesting feature of Morse's paper was his discussion of the present status of the branch line. This line, he said, was built to carry much lighter equipment than the main lines and was supplied with power and rolling stock from the obsolete material, usually from the older units. This small material was now about worn out and the railroads are confronted with the problem either of rebuilding the branch lines to carry heavier units of rolling stock or of building lighter units especially for use on the branch lines. Either necessity would mean the employment of much capital that the railroads can ill afford to apply in this direction.

Davis, in discussing the "field of truck transportation," said that there are so many conditions affecting the cost of transportation of freight that he would not attempt to define the mileage that should be considered the dividing line between railroad and truck transportation. He presented two tables of cost, one based upon door-to-door delivery from Buffalo to nearby and more remote cities, and the other on similar costs from various shipping points to New York City. In these tables, reproduced herewith, the relative cost and time of delivery as between the two methods of handling freight can be found.

COMPARISON OF THE COST OF DOOR-TO-DOOR DELIVERY OF FIRST-CLASS L. C. L. FREIGHT

Table I—From Buffalo to various points.

Buffalo to	Miles	Flat freight rate	*Total cost by rail per 100-lb.	Time by freight days	†Truck rate per 100-lb.	‡Time by truck hours
Tonawanda	10	$0.25	$0.83	2	$0.25	2
Niagara Falls	26	0.28	0.87	2	0.35	4
Batavia	37	0.31	0.90	2	0.60	5
Rochester	72	0.38	0.99	3	0.80	9
Jamestown	77	0.54	1.17	2	0.90	9
Erie	92	0.59	1.23	2	1.00	10
Ashtabula	129	0.67	1.32	3	1.30	14
Elmira	145	0.61	1.25	4	1.40	15
Syracuse	154	0.56	1.20	2	1.50	16
Utica	203	0.66	1.31	3	2.00	21
Binghamton	204	0.70	1.36	3	2.00	21
Pittsburgh	241	0.84	1.52	5	2.50	26
Albany	308	0.72	1.38	4	3.00	31

Table II—From various points to New York City.

To New York City from	Miles	Flat freight rate	*Total cost by rail per 100-lb.	Time by freight days	†Truck rate per 100-lb.	‡Time by truck hours
New Rochelle, N. Y.	17	$0.42	$1.03	1	$0.25	3
Stamford, Conn.	34	0.48	1.10	1	0.60	4½
Bridgeport, Conn.	57	0.56	1.20	2	0.75	7
New Haven, Conn.	74	0.59	1.23	2	0.80	8½
Hartford, Conn.	109	0.63	1.28	5	1.10	12
New London, Conn.	127	0.70	1.36	5	1.30	14
Springfield, Mass.	150	0.63	1.28	7	1.50	16
Providence, R. I.	185	0.74	1.41	4	1.90	20
Gloucester, Mass.	201	0.85	1.54	7	2.00	21
Fall River, Mass.	220	0.74	1.41	5	2.20	23
Boston, Mass.	233	0.74	1.41	4	2.40	25
Lowell, Mass.	259	0.79	1.46	7	2.60	27

*Total cost by rail per 100-lb. equals freight rates plus teaming charges both ends ($0.30) plus cost of extra boxing ($0.24) plus extra freight charges on increased weight of boxing (17 per cent of freight rate.)

†Trucking Association figures (1920).

‡Loading and unloading time of 1 hr. plus running time at 10 m.p.h.

In his discussion of the field awaiting the bus, Davis took the position that the future of the passenger traffic of the automotive vehicle is as an ally of the track systems of the cities, and not as a means of replacing subways, elevated and electric roads. His statement in this regard was similar to that of George M. Graham, who was spokesman for the automotive industry at the recent convention of the Electrical Transportation Association.

The Possibilities

As to the present status of the truck transportation, Davis said that there are 260,000 miles of railways and 2,500,000 miles of highways in this country. Of the latter practically 300,000 miles are classed as surface roads, but the total figure indicates the possibilities. He estimated the present number of trucks at 800,000 and said that if each hauls five tons of freight daily, the total for the year would be close to a billion and a quarter tons. The railroads in 1918 hauled 2,504,000,000 tons of freight.

Davis said that so many conditions enter into the costs of truck transportation that the actual cost in the average case cannot be given. The present need is for a standardized cost system for such transportation.

The greatest single item of improvement in truck transportation has been development of the ability of a truck to make its way over hills and poor roads. He then told

of the work being done by the Educational Conference on Highway Engineering and Highway Transport Engineering for the development of men competent to handle the transport of the future.

In closing Davis presented the following conclusions:

"Railway transportation should and will hold its place for long hauls, and for carload shipments where there is direct railway connection to the factory or warehouse of the shipper.

"Motor transportation will relieve the railroads of the expensive short haul, serve them at terminals and widen the zone tributary to railroads throughout their entire length.

"It will supplement the street railways.

"It will spread into a wide field where the engine power can be utilized for auxiliary purposes.

"With the steady improvement of devices for shortening the loading and unloading time there will be a reduction in the use of horses for heavy freight haulage.

"The economic limit of the size of motor trucks will probably remain about as at present, although the use of trailers will increase the tons hauled per movement.

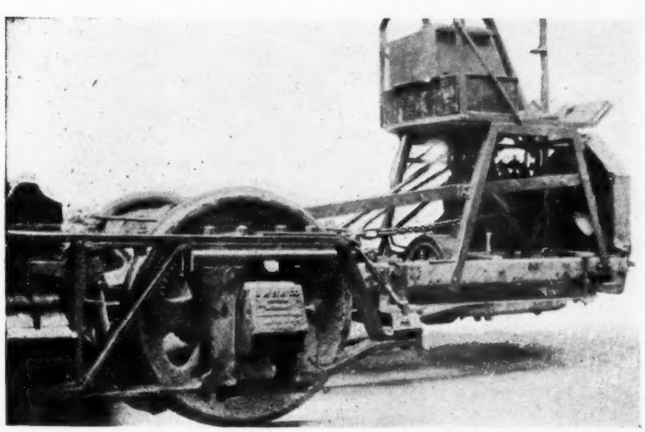
"The use of motor trucks will increase with the general improvement of the highways.

"The motor industry will welcome sound and uniform legislation and aid in securing it."

Operating Railway Cars with Gasoline Engines

THE operation of short-line railways in which steam locomotives are employed for handling both freight and passenger traffic has often proved an unprofitable enterprise. This has been especially true during the past few years, when operating costs advanced rapidly, due in part to State and other regulations requiring a full crew on all trains. For this reason many efforts have been made to substitute gasoline propelled vehicles for the steam locomotive. In many instances ordinary motor trucks have been equipped with steel wheels, for running on rails, and passenger-carrying bodies, and these vehicles have in some cases been used to haul freight cars, especially where the grades are not heavy, and the tractive effort required is consequently small. In one instance which has come to our attention, trucks using both solid rubber tires and steel flanged wheels have been employed. The steel wheels were used when the truck ran on the rail and the rubber tires, which were of larger diameter and overhung with rails at the outside, were used when the vehicle was required to run on the ordinary road to pick up or discharge freight. This rendered door-to-door delivery possible and enabled the operation of a road which had previously been abandoned because of the high cost of operation with steam equipment.

Donald A. Hampson has recently sent us particulars concerning another application of the gasoline engine to railway use. In this case a car previously used for electric railway service was employed. One of the trucks of this car was fitted with a 4¾ x 5½ in. 4-cylinder automobile engine, driving through a cone clutch to a gearset, and then through a jackshaft and double chain final drive to the front axle of the truck. This assembly is shown in the accompanying photograph. The wheels of the truck are 33 in. in diameter. No differential is used in the jackshaft, the latter passing directly through the master gears. The total gear reduction, engine to axle, is 5.7 on high and 14.6 on low and reverse, with an intermediate speed between. This arrangement permits a reverse speed of 12 m.p.h. without undue racing of the engine, and overcomes what is said to have been a drawback in the adaptation of existing automotive equipment to railroad use, namely, the slow speed at which backing and general yard movement can be made with the ordinary transmission and gear ratio. Driving on one axle of the truck only is said to be practical so long as the weight on wheels is, as in this case, several times the maximum tractive effort obtainable.



Truck of rebuilt street car driven by automobile engine

The weight of the car, as equipped, was 25,000 lb., the rear truck alone weighing 7000 lb. and the power truck 8100 lb. Since each truck carries one-half the weight of the car body, the total weight on the power truck was approximately 13,000 lb., of which about 8000 lb. is carried on the forward driving wheels. The car, as equipped, has negotiated a 6 per cent grade, and in trial tests had no difficulty in moving a 28-ton interurban electric car from rest, without slipping the driving wheel, and getting into second gear within 40 ft. Thus, when used as a tractor, this truck moved seven times its own weight. Mr. Hampson estimates the tractive effort required to accomplish this as between 700 and 800 lb. Speeds of approximately 30 m.p.h. have been obtained.

The car used is 30 ft. long, exclusive of platforms, and has longitudinal seats accommodating about 40 passengers. It was not intended for year-round use, but for service during the seven months of the year, when passenger traffic is heavy. The purpose was to stimulate traffic by giving more frequent service at lower cost than is economically possible with steam trains. As shown in the photograph, the operator's seat is above the engine, the powerplant having been left intact exactly as arranged in the automobile frame. When the truck is in place the driver sits in approximately the same position ordinarily occupied by the motorman, the radiator coming at a point approximately flush with the front end of the car.

THE German aerial services connecting Amsterdam, Bremen, Hamburg and Copenhagen and Berlin, Warnemunde, Malmoe and Copenhagen have been suspended for the winter. The present intention is to resume these services in March next. The service between Berlin and Bremen is to be maintained during the winter.

Friction Drive Revived in New Kelsey Six-Cylinder Car

Friction disk and wheel are located within rear axle housing, which is of aluminum alloy and is said to be lighter than standard type. Jackshaft carries helical pinion meshing with internal gear on wheel hub, giving 4.5 to 1 reduction. Wheelbase is 116 in. Engine 3⅛ x 4¼ in. Falls.

THERE have always been some staunch supporters of the friction drive for automobiles, among both technical and commercial men. Most of these have had some connection with one of the two or three firms which in the past have produced friction driven passenger cars in considerable number and know exactly where the weaknesses of these cars lay. They are of the belief that these weaknesses can be eliminated and that the inherent virtues of the drive make it superior to the positive gear transmission.

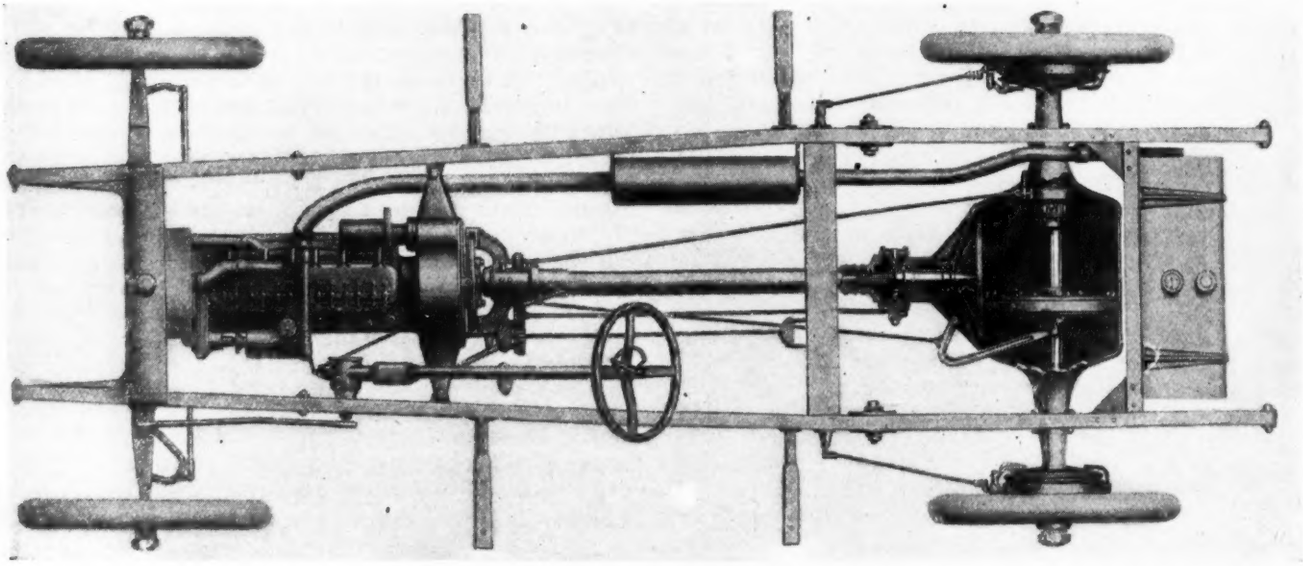
The chief advantage of the friction drive is that it permits of a large number of varying reductions with a very simple mechanism. In one respect the number of different reductions obtainable is infinite, but as the lever by which the friction wheel is slid across the face of the disk is held in position by a latch engaging in slots on a sector, the number of ratios available for regular driving is limited, though greater than on gear-driven cars. Then there is the elimination of shocks to the mechanism due to "grabbing" of the clutch, and a further important advantage resides in the noiseless operation at all speeds.

One of the friction drive enthusiasts is C. W. Kelsey, who many years ago was connected with the old Maxwell-Briscoe Co. at Tarrytown, N. Y. Mr. Kelsey took up the development of a friction driven car seven years ago and was about ready to begin production when the war interfered with his plans. He has now completed designs for a six-cylinder car and has opened a plant in which production has been begun.

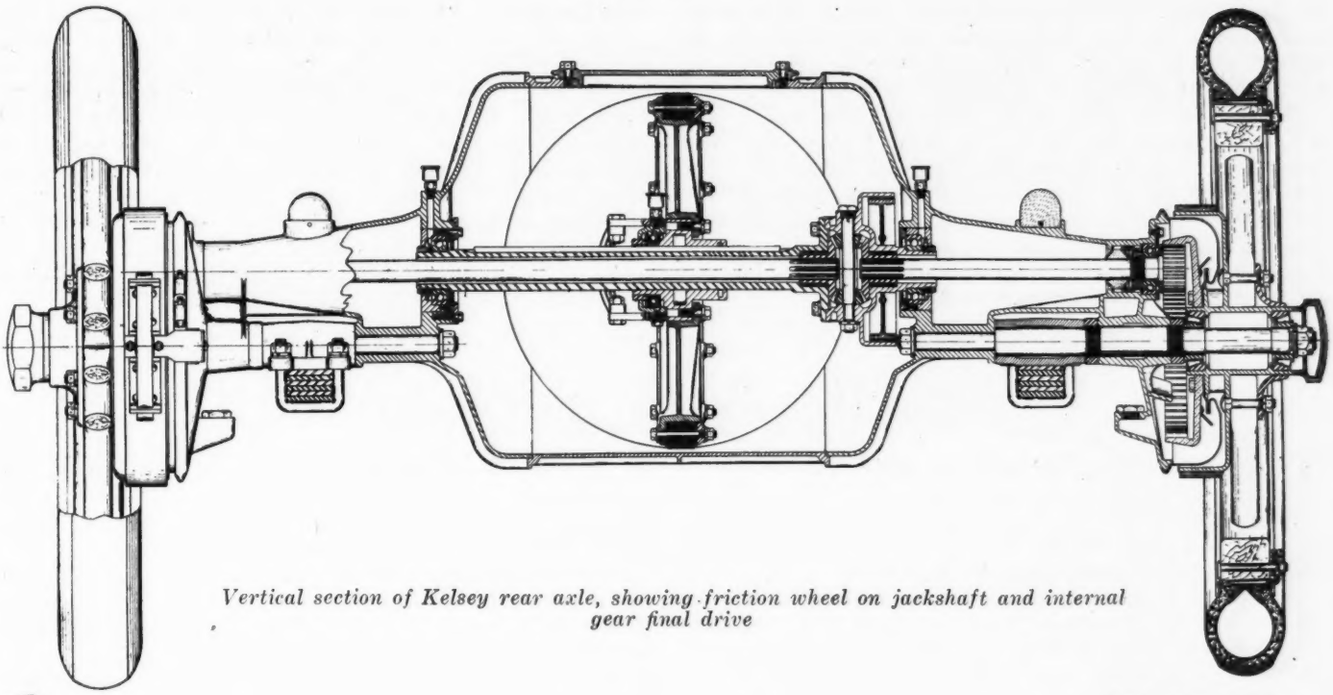
In the Kelsey car the chain transmission, which was a feature of all previous friction driven cars and no doubt was one of the causes of their unpopularity, has been dispensed with. There is a shaft drive from the rear end of the engine crankshaft to the friction disk enclosed in the central housing of the rear axle. This shaft connects to the crankshaft through a fabric disk joint and is surrounded by a steel tube which takes the torque reaction of the final drive. At the rear end the shaft is splined for driving connection with the short shaft carrying the friction disk which must be slid back and forth to engage it with and disengage it from the friction wheel. The torque tube surrounding the propeller shaft is provided at its forward end with a swiveling fork which is hinged to the flywheel housing, so that the flexible joint is not subjected to the stress of torque and brake reaction.

The propeller shaft is supported on ball bearings at both ends. Lubrication of the forward bearing is effected by grease cups, while the rear bearing is contained in a casing provided with a plug through which lubricant can be injected.

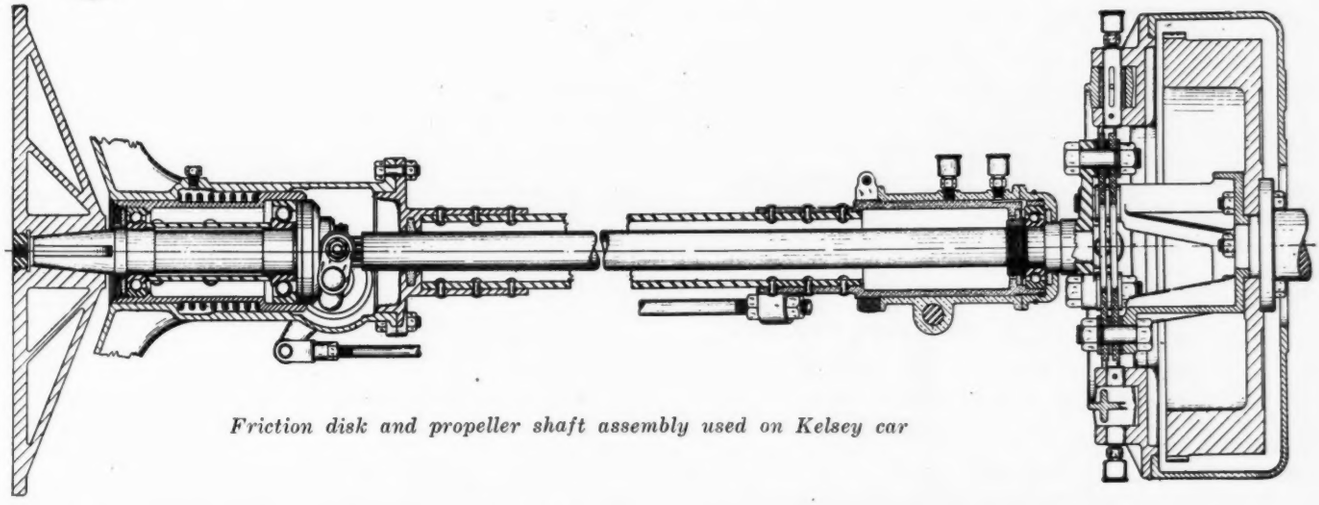
The friction drive takes the place of the regular gear transmission or gearset, and also of the clutch on the conventional car. To this end the propeller shaft and the short shaft of the friction disk are coupled together by means of a splined sliding coupling. To engage the friction members, the left pedal is pressed down, a ratchet holding it in whatever position it is set. By rocking the pedal the ratchet is released, and the pedal



Chassis of Kelsey car, showing friction drive



Vertical section of Kelsey rear axle, showing friction wheel on jackshaft and internal gear final drive



Friction disk and propeller shaft assembly used on Kelsey car

then returns to its normal position. The pedal controlling the friction disk is interconnected with the brake pedal, so that in an emergency if the foot brake is applied the friction drive is automatically disengaged. It is possible, however, for the driver to apply the foot brake and still keep the friction drive in engagement, by keeping his left foot on the clutch pedal.

The friction drive proper consists of a metal disk, thoroughly ribbed for stiffness, and mounted on a taper section of the shaft, to which it is held by a nut; and of a spoked metal wheel with a renewable fiber or mill board rim. Both disk and wheel are a little over 17 in. in diameter. The friction wheel is splined to the jackshaft, on which it slides back and forth, its position on the driving disk, and consequently the speed of the rear wheels, being controlled through linkage from the shaft lever. There is a differential gear in the jackshaft, which is located within the rear axle housing, and a brake drum is formed integral with the frame of the differential.

To each end of the divided differential shaft is secured a helical pinion, which engages with an internal helical gear bolted to the hub of the rear wheel. This pair of gears gives a reduction ratio of 4½ to 1.

As may be seen from the sectional view of the rear axle herewith, the internal gears on the rear axle are completely enclosed and run in a bath of oil. No packing is used on the gear housing, but oil rings and return passages are provided to prevent leakage, all of the oil which is raised and thrown off by the revolving gears returning to the bottom of the housing. The supply of oil in the reservoir may be replenished by unscrewing a filler plug.

The rear axle housing, the friction disk and wheel of the Kelsey car are made of Amalite, a new alloy which is almost as light as aluminum and possesses considerably greater tensile strength than the usual aluminum alloys. Although the central housing of the rear axle is rather bulky, the axle is said to be lighter than a standard gear axle of the same capacity owing to the use of this light alloy. As the central housing is not concentric with the wheels, but concentric with the jackshaft, which is located above the wheel axis, the ground clearance is 10 in.

The engine used in the Kelsey is a six-cylinder Falls valve-in-head type, with 3⅛ x 4¼ in. cylinders. Ignition is by the Atwater-Kent battery-coil system, and starting and lighting are by the Bijur 6-volt, two-unit system. The battery is a 6-volt, 94-ampere hour Willard.

The carbureter is a Tillotson and gasoline is supplied

by the Stewart vacuum system from a 14-gal. tank at the rear of the frame. Lubrication of the engine is by splash, with pump circulation. Grease cups are provided on the springs and at other chassis bearing points.

The wheelbase is 116 in. and the road clearance 10 in., which is greater than usual on cars of this size. The frame is of 7-inch pressed steel channel section, 5/32 in. stock being used. The springs are semi-elliptic all around, the front springs being 36 x 1¾ in. and the rear 53 x 2¼ in. The front axle is drop forged, its section measuring 2⅛ x 1¼ in. The rear axle is a built up construction, the wheels being mounted on stub axles fitted into the cast axle housing, as shown in accompanying cut.

The service brakes operate externally on 12-in. drums secured to the hubs of the rear wheels, the emergency brake being applied on the jackshaft by the customary hand lever. Steering is by irreversible worm and wheel with a 17 in. hand wheel, carrying the horn button at the top of the column. Artillery wheels are used, each wheel being mounted on two Timken roller bearings. Rims are of the split type, Stanweld, and tires are 32 x 4 in., with non-skid in the rear.

Body styles include a touring car selling at $1,800, a runabout listed at $1,750 and a sedan for $2,700.

The Harvey Steel Disk Wheel

THE Harvey wheel is a built up steel disk wheel in the design of which an attempt has been made to reduce or eliminate the rigidity characteristic of metal wheels in general. Referring to the cuts, it will be noted that the front and center disks, with the hub as their base, form a curve arch which has its apex at the front side of the felloe, while the center and back disks, with the felloe as their base, form an inverted curve arch with its apex at the hub.

The disks forming the sides of these arches carry the load imposed upon the wheel in suspension, and when a sudden load is applied or a larger load than that which the wheel was designed to carry without deflection, the curves of the disks on the tension side increase in radii or "straighten out" slightly, while the portion of the disks on the compression side contracts in radii or increases in curvature, thus allowing a slight displacement of the hub. As soon as the increasing tension in the deflecting disks equals the imposed load further displacement ceases.

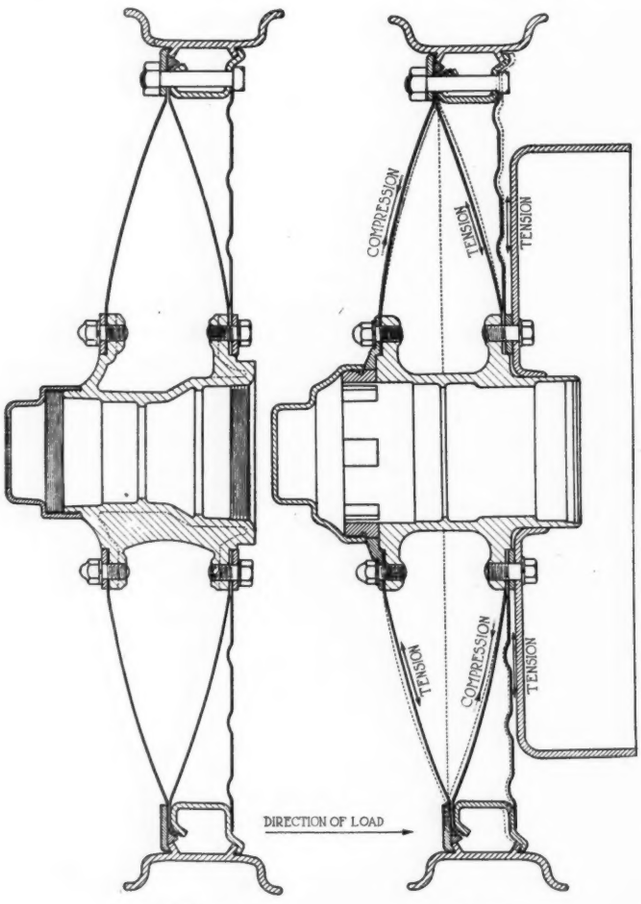


Fig. 1 *Fig. 2*

Harvey steel disk wheel

The strength of the wheel in a vertical plane (or in the line of all bumps encountered while driving straight ahead) is said to be many times that required, because the wheel has been primarily designed to give great lateral strength. The bracing of the disks, one against the other into arches, will be seen to bring all disks into tension when a "side swipe" occurs (see Fig. 2) and here again the curvature of the disks allow a displacement of the hub and felloe to take place, this time laterally. This displacement of the felloe under lateral strains reduces the shock on the mechanism of the car.

According to the manufacturers, the Harvey wheel, though of increased strength, weighs only a few pounds more than a wood wheel on light cars and on heavy powerful cars generally weighs less than wood wheel equipment. The assembly of the disks completely encloses the wheel back and front, leaving no shelf at the felloe to collect dirt. This complete enclosing of the wheel also affords streamlining similar to that found desirable on aircraft wheels.

A cover over a hole in the front disk, when removed by one-half turn of a screw driver, leaves a large hand hole opening through the front and center disks through which the air valve may be reached from the front of the wheel. There is sufficient clearance to allow the use of the air line end and of the ordinary pressure gage.

The Harvey rim was patented some five years ago, but has been commercially available for only a year. The rim is made up of three pieces, each one-third the circumference of the bead of the tire in length, and these three sections interlock in a simple way, making a rim which is easily put on or taken off a tire.

There are two ribs rolled into the rim section, each extending completely around its inner circumference. The felloe and locking ring, each being complete circles, clamp onto these ribs completely around the rim. The felloe and rim are so constructed as to form a V groove into which the locking ring fits. The rim is thus held securely to the wheel and is not forced out of round by tightening individual wedges spaced at intervals between felloe and rim.

IT is remarked in the Air Service Information Circular that if it is desirable to adopt the principle of the auxiliary spark gap, this can be done with little alteration of existing equipment. Many types of magnetos, including the latest Dixies and Simms, incorporate the subsidiary gap in the distributor. This could also be done easily with the Liberty engine by substituting a distributor finger with a fixed gap brush.

Engineering Features of New British Trucks at Olympia

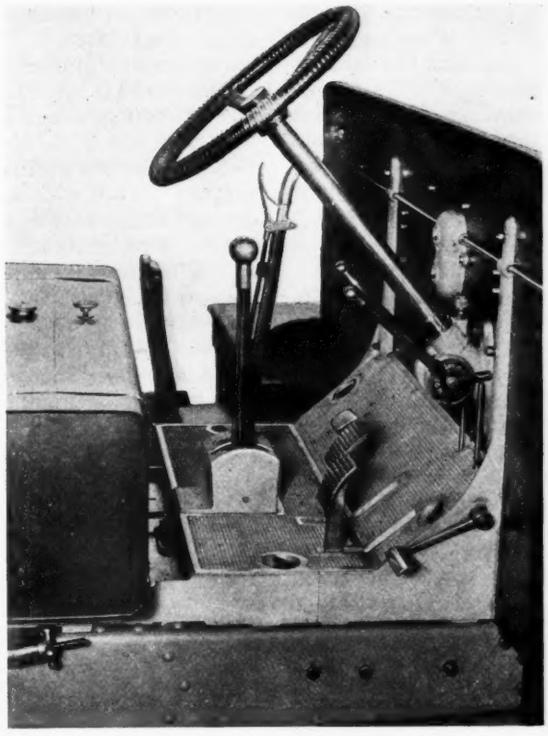
Careful attention to details heretofore neglected and many refinements in design feature new models. Bristol 3 to 4-ton has electric lights, new transmission and 16 in. single-plate clutch. Halley uses 6-cylinder engine, shaft brake at rear of worm and novel steering connections. Austin has only unit powerplant. Single plate clutch, propeller shaft brakes, overhead worms, plain bearing rear axles and steel wheels, generally used.

By M. W. Bourdon

THE 3-4 ton chassis, made by Bristol Tramway Co., a firm with 14 years' experience as users of truck and omnibus chassis of other makes, has a pressed steel frame, with the side members 8 in. deep by 2½ in. wide. There are five cross members, one a banjo type in pressed steel in front of the rear axle, through the central hole of which the propeller shaft passes. The latter is tubular, 60 in. in length and 3½ in. in diameter, with spiders at each end, brazed and riveted on, and arranged to carry fabric disk universal joints. The latter are partly enclosed within short cylindrical casings to prevent the shaft ends falling in the event of the disks giving way.

The four pair-cast cylinders of the engine have a bore and stroke of 4½ x 5¾ in. Trough lubrication and a three bearing crankshaft are used. The big ends have four bolts each, and the distribution gear is by means of silent chain. The piston pin is secured in the connecting rod small end, which is not split but has a bolt passing through it below the pin, locating the latter by means of a shallow notch. The pin floats in the bosses of the cast iron piston without bushes. Thermo-syphon water circulation is relied upon, and a Claudel carbureter provides the mixture. A second (butterfly) throttle is controlled by a centrifugal governor of the floating steel ball type. The governor linkage is entirely enclosed in the crankcase, and is nowhere exposed, so that it cannot be tampered with by the driver.

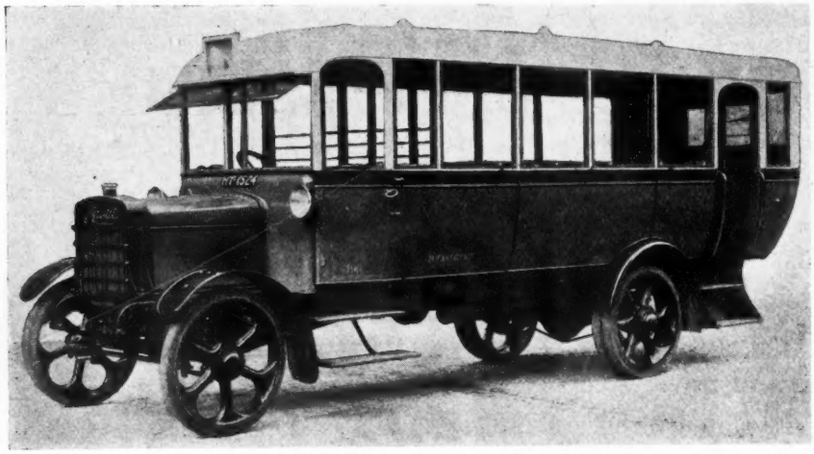
The engine is suspended in the main frame at three points. The crankcase is suspended at the center above the distribution casing from a stamped steel bridge. A similar bridge at the back has the rear end of the crankcase depending from it at two points. Dynamo lighting is standard in the equipment, the generator being arranged with its armature vertical and with a right angled shaft drive from the distribution case. A single plate clutch is used, the plate being 16 in. in diameter. The light flywheel is 20 in. in diameter and but 2½ in. wide. The normal speed of the engine is 1400 r.p.m., which is higher by 300 to 400 than the normal in British truck engines.



Controls of Bristol chassis. Cables of electric lighting system are throughout enclosed in metal conduits. Side and tail lamps, switch casings, footboards, footboard frame and dashboard brackets are all in cast aluminum. Steering wheel is coated with corrugated xylonite

A coupling shaft 27 in. long with steel disk joints at each end connects the clutch to the four-speed gearset, which has a central lever. The movement of this lever occurs across a gate projecting up through the footboard and rocks a single shaft leading back into the gearset. At the rear end this shaft has a fork at right angles which, according to its position, as determined by the extent of oscillation, engages with an upstanding lug on one of the three selector rods. An outer sleeve incloses the end of the oscillating shaft and is slotted circumferentially and axially, the axial slot allowing only one selector rod lug to move to and fro, the circumferential slot locking the others. The designer claims low cost of production for this method as compared with other gearset controls where the lever is not actually mounted on the box; but another advantage claimed is that the low weight of the connections and the small leverage prevents "clashing" and damage to the gears, any endeavor on the part of the driver to ram the gears into mesh reacting so forcibly on his arm as to make him adopt less forceful methods in future.

The gear-casing is suspended at four points from brackets extending from the main frame. A transmis-



Bristol double entrance bus seating 28

sion brake is fitted behind the gearset; this has deeply ribbed shoes lined with fabric and operated by the rotation of a cam plate, on which projecting "tongues" engage ball-ended studs attached to each shoe end. This brake drum is 14 in. in diameter by 4 in. wide. The hand brake lever operates internal shoes in open side rear wheel drums 4 in. wide of 18 in. diameter.

The final drive is by overhead worm mounted with the worm wheel as a unit and attached to the top cover of the cast steel axle. The latter has flanged and bolted-on extensions for the spring tables and wheels, which run on ball bearings. The method of locating the springs on the axles is unusual; two stirrup bolts clamp a bridge piece onto the top of the spring, the bridge having sides 3 in. wide which extend downward into milled cross slots in the spring table, and these form "keys" between spring and axle, relieving the center bolt and stirrups of longitudinal stresses.

The wheels are of the cast-steel hollow-spoked variety, with six spokes back and front. Worm and sector steering is used, with the sector shaft mounted on eccentric bushes at each side. These bushes are capable of being either rotated or moved axially after slackening pinch bolts passing through their housings in the extensions of the casing; thus both tooth slackness and sideplay can be taken up. The steering levers have ball ends with half-sockets formed in the triangular flanged ends of steel stampings attached to the rods, three bolts and nuts being used to secure each cap on which is the other half-socket. The chassis has a wheelbase of 170 in., a track of 70 in.; the final drive ratio is 7 to 1. Fuel feed is by gravity. The price of the chassis with solid tires is $6,250.

2. The Straker-Squire 3-5-Tonner

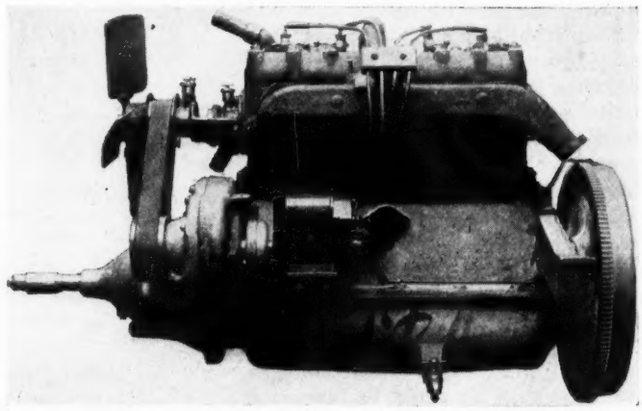
This is a new model which, although announced nearly 12 months ago, has only just gone into production. It has a pressed steel frame, with the open side of the channels outward, the side members being 8 in. deep by 2½ in. wide at the center. The cross members consist of steel forgings at the front, and between engine and gearset a tubular member approximately midway in the chassis length and a forging at the rear. The latter also forms a bridge support for the rear ends of the back springs, and which has leading from it two diagonally arranged stiffening plates extending forward to a point inside the main frame where the brackets occur on the front end of the rear springs.

The spring mountings back and front are a special feature. The back ends of the front springs and the front ends of the rear ones have a ball-ended stud passing through the two top plates and projecting upward into a spherical socket formed in the spring bracket; the ball is drilled transversely for a lateral retaining pin. The other ends of the springs slide under blocks which have a spherical abutment in box brackets. A set screw passes up from the bottom of the bracket to prevent hammering arising from the liability of spring surface and slide block to separate on rough roads. Both front and rear axles have coil buffer springs, those at the back being stiff and long enough to take a considerable proportion of the weight when the vehicle is fully loaded.

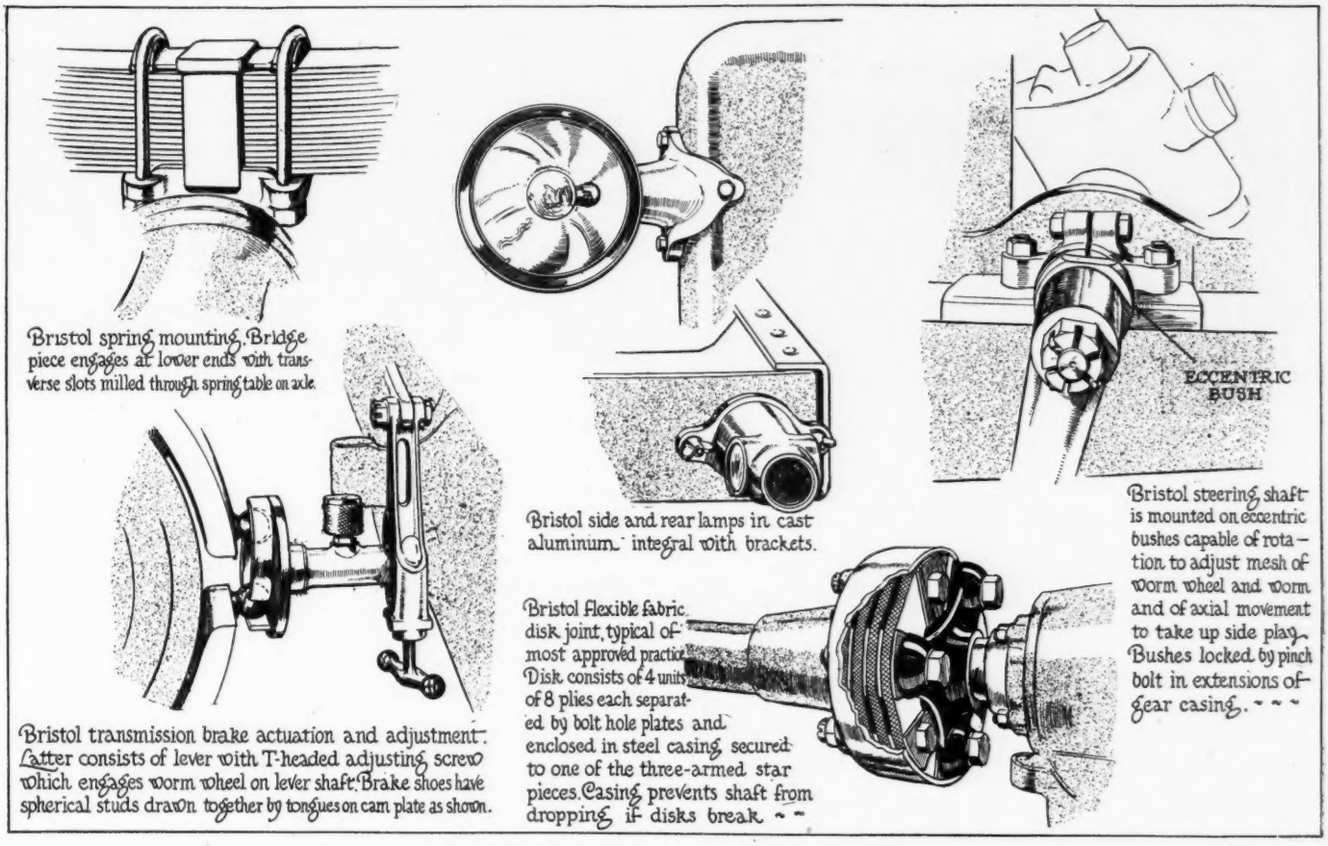
A feature of the general arrangement of the chassis, and one which provides an increased length of loading platform without extending the wheelbase, is the moving of the driver's seat rather more forward than usual, so that half the length of the engine projects through the dashboard. The driver's position is also higher than usual and the steering column projects forward to the front end of the right-hand side member. While this arrangement has the advantage mentioned, it does not increase accessibility of certain engine details, but rather the reverse.

The peculiar mounting of the overhead rockers of the 4½ x 6½-in. engine has already been referred to and illustrated in AUTOMOTVE INDUSTRIES. It may be recalled that instead of pivot pins the rockers are supported on upstanding spring steel plates which flex when the push-rod takes effect upon the outer end of the rocker and cause the inner end to have the usual effect upon the valve stem.

The cylinders and the upper half of the crankcase are cast as a unit with a detachable head, but engine and gearset are separately mounted on a sub-frame of angle plate. The engine lubrication system differs from the usual, a plunger pump delivering oil to the camshaft bearings, through two ports through which the oil issues in a stream in the path of scoops on the crank webs, whence the lubricant is led through the hollow shaft to the big-ends. The journal bearings are of the roller type—three in number. Crank pins and journals are both 3 in. in diameter by 2 in. long; hollow wrist pins, 1¼ in. in diameter, are fixed in the rod end, with phosphor bronze bushes in the piston. Water circulation is by a pump at front end of cylinder block, the impeller being mounted on extension of the belt-driven fan shaft.



One of the few block cast cylinder and detachable head engines among British trucks—the 20-*hp. Albion for* 2800 *lb. loads. Bridge forgings support crankcase at front and rear in main frame*


Bristol spring mounting. Bridge piece engages at lower ends with transverse slots milled through spring table on axle.
Bristol transmission brake actuation and adjustment. Latter consists of lever with T-headed adjusting screw which engages worm wheel on lever shaft. Brake shoes have spherical studs drawn together by tongues on cam plate as shown.
Bristol side and rear lamps in cast aluminum, integral with brackets.
Bristol flexible fabric disk joint, typical of most approved practice. Disk consists of 4 units of 8 plies each separated by bolt hole plates and enclosed in steel casing secured to one of the three-armed star pieces. Casing prevents shaft from dropping if disks break.
ECCENTRIC BUSH
Bristol steering shaft is mounted on eccentric bushes capable of rotation to adjust mesh of worm wheel and worm and of axial movement to take up side play. Bushes locked by pinch bolt in extensions of gear casing.

Some details of British trucks exhibited at Olympia

The four-speed gearset has its shafts arranged side by side on ball bearings. The casing is a one-piece casting with four arms projecting to the subframe, the lay shaft having an extension provided for supplementary drives, such as tipping gear, etc. The open propeller shaft is approximately 110 in. long, of 3¾ in. diameter tube, with an unenclosed star type joint at each end. The pins of these joints have blind phosphor bronze bushes, stuffing boxes to prevent the escape of lubricant at their inner ends and central lubrication. Overhead worm gear forms the final drive, the worm and worm wheel being mounted as a unit with the cover plate of the cast steel one-piece axle casing. The wheel bearings consist of floating bushes on the axle ends, while the springs are under-slung from the axle by stirrup bolts 1 in. in diameter.

Both brakes take effect on 22 in. x 7 in. drums bolted to the seven hollow spokes of the cast steel wheels. The brake anchorage brackets, bolted to the axle casing, have circular gutters with drain pipes to carry off any oil that may leak from wheels or axle ends. The chassis price with solid tires is $6,500.

3. The 2-Ton Commer

Several features hitherto associated with Commer trucks have been discarded in this new model. For example, chain drive, constant mesh wheels and dog clutches in the gearset, and rolled steel frame sides. This new type has a pressed frame with a cast front cross member and four pressed cross members. The 4 x 4¾-in. four-cylinder engine has pair cast L head cylinders and three-point suspension by means of a trunnion bearing at the center in front and a bridge at the back bolted to the end face of the one-piece aluminum crankchamber. The crankshaft is carried on three ball-bearings. A trough system of lubrication is used, the oil pump delivering the whole of its supply through a direct lead to a sight feed indicator on the dashboard, the lubricant flowing thence by gravity through a ⅞-in. pipe to distributing passages in the crankcase.

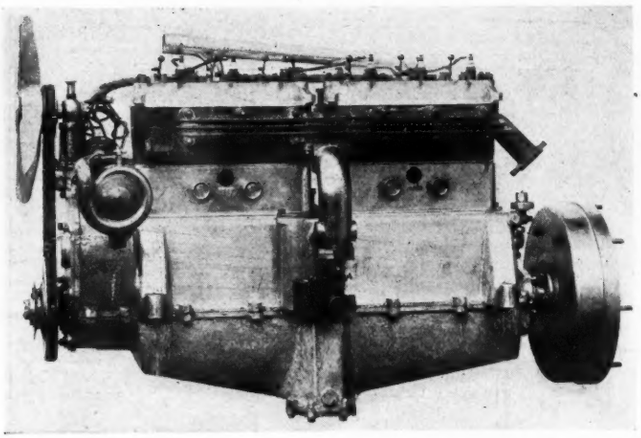
Water circulation is by thermo-syphon through a vertical tube radiator with cast aluminum tanks and side plates, the latter having lugs mounted in fiber-lined trunnion bearings supported by the front cross member. No governor is fitted, nor are the valves inclosed. A small diameter cone clutch with high spring pressure conveys the drive to the three-speed gearset, which is slung from two cross members, the coupling shaft having a single flexible steel disk joint. Behind the gearset is a transmission brake with cam-operated shoes and metal liners acting upon a drum of small diameter (8 x 4 in.).

The propeller shaft is semi-inclosed, an open coupling shaft occurring between the gearset and the front universal joint, which is located within the spherical end of the torque tube, the latter being supported by a deep-pressed steel cross member.

An overhead worm gear forms a final drive with a unit mounting which forms the cover plate of the cast steel back axle; the latter has bolted-on flanged extensions for the rear wheels, the latter running on floating bushes. Open-sided drums are used for the expanding rear wheel brakes. The cast steel hollow spoked wheels have twin solid tires at the back and seven spokes. The front wheels have six spokes. With solid tires the chassis is sold at $1,125.

4. 30-Cwt. Albion

This, a new model made by one of the oldest firms of truck manufacturers in Great Britain, has several radical departures from the makers' practice current hitherto. The pressed steel frame, 6 in. deep and 2¾ in. wide,



Six-cylinder engine of Halley 3-3½ tonner has cylinders in threes with detachable heads. Expansion joint occurs in length of ribbed exhaust manifold

has displaced the rolled channel section of the older types. Three tubular and two pressed steel cross members are used. This is one of the few British truck chassis having an engine with block cast cylinders (3½ x 5 in.) and a detachable L head. The two-unit aluminum crankcase has a four-point suspension system from bridge forgings back and front, the bridges being secured directly to the side frame members. The system of forced lubrication is distinctive, there being five small pumps delivering lubricant to each main bearing of the hollow crankshaft and to camshaft and other subsidiary bearings.

An inclosed throttle governor is standard, the water circulation being by a pump driven by the 2½-in. wide flat fan belt; the pump casing is secured to the front of the cylinder jacket with an accessible gland adjustment for its shaft.

A single plate clutch is used with a solid coupling shaft to the three-speed gearset, which is hung from two longitudinal milled steel bars, which in turn are suspended from two pressed steel cross members. The selector gear is exposed, the hinged hand lever engaging directly with either of two forked levers as it passes across the gate, the forked levers being mounted on concentric shafts, which at their inner ends have "fingers" to engage with forks on the selector rods.

Within the gear casing the shafts lie side by side, the main shaft ends having felt packing glands adjustable from outside; a contracting type shoe brake is arranged at the front of the open propeller shaft, which has two metallic joints, one star type and one sliding block. Overhead worm gearing is the final drive, mounted as a unit above the ring or banjo type forging forming the axle casing center. The ring center is horizontal, and has a cast steel oil pan and stiffening plate below it. The wheels run on plain stationary bushes on the axle ends; torque is taken by the springs, and inclosed expanding rear brakes are attached to the web cast steel wheels. Chassis price is $4,000.

5. 3-3½-Ton Halley

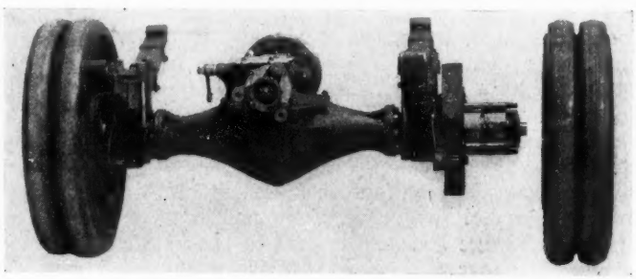
This is the only six-cylinder British truck, and although it is a new type, it has a rolled steel frame with the open sides outward. Two cast steel cross members carry a subframe for the engine only the gearset being suspended from two tubular cross members at three points. Behind this there are two pressed steel cross members, the rearmost having diagonal struts to the main frame.

The engine cylinders are cast in threes with detachable L heads, the cylinder castings being mounted separately on the aluminum two-unit crankcase. The latter supports the crankshaft in three bearings, while the connecting rod big-ends, departing from current British practice, have only two bolts, although the bore and stroke of the engine are 3½ x 6 in. and the normal speed is 1200 r.p.m. Silent chain distribution, trough lubrication and pump water circulation are used, the pump being driven by a transverse shaft with the magneto at the other end.

Provision is made for a lighting dynamo and a starting motor, and these can be supplied as an extra to the normal chassis, which is sold with solid tires for $6,600. Provision is also made for a mechanically driven air pump. When giant pneumatics are fitted, the pump being located on the right of the crankcase and driven through skew gearing, a dog clutch and a fiber disk coupling from the camshaft on the opposite side of the engine.

A single plate clutch connects to the four-speed gearset by means of two disk joints in the coupling shaft. The gear shafts are splined and arranged side by side on ball-bearings. A mileage recorder is driven from one of the lay-shaft pinions and supported by an aluminum bracket below the right side frame member. The solid open propeller shaft has splined ends sliding in the star pieces of two fabric disk joints. A shaft brake is located at the rear end of the overhead worm shaft, the bearings of which and those of the worm wheel are located in housings attached to the cover-plate of the cast steel axle casing. The latter has flanged ends with bolted-on extensions for the spring mountings, brake anchorage and ball bearings of the wheels. The transmission brake on the worm shaft and the wheel brakes are all of the internal variety, the rear wheel drums having open sides.

A feature of the steering is the mounting of the lever so that it extends above the worm shaft. This arrangement puts the drag link in a higher position and enables the front wheels to have a wider lock. The drag link is coupled at its front end to a steering lever secured by three bolts to the top of the jaw end of the swivel



Halley back axle with worm drive and brake at rear end of worm shaft. Rear wheels run on ball bearings

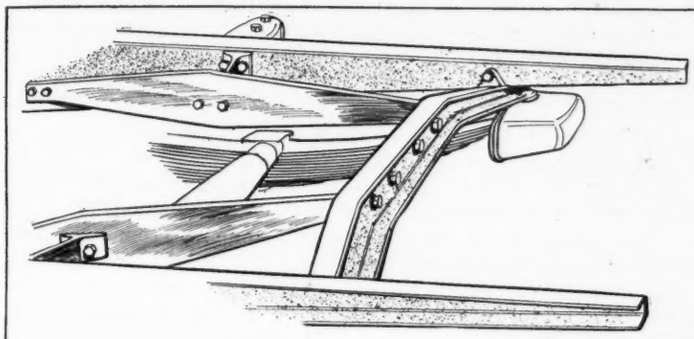
axle. A similar lever is used below the swivel and on that at the opposite side for the coupling rod. This construction enables the swivel axles for right and left sides to be made identical in form and interchangeable.

The radiator is mounted on trunnion bearings, has vertical gilled tubes and cast aluminum tanks. Cast steel hollow spoked wheels are used, the wheelbase being 160 in. and the track 62 in.

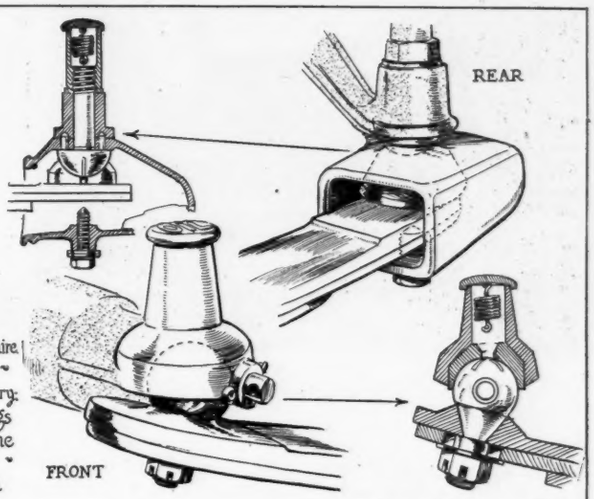
6. 30-Cwt. Austin

This is the only British truck chassis with unit construction of (3¾ x 5 in.) engine and gearset, this unit

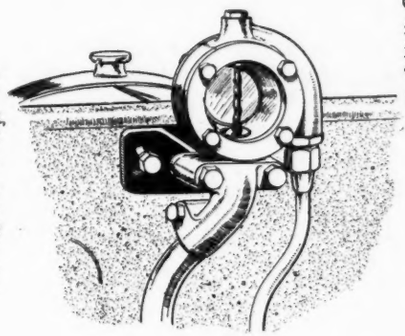
Some Novel Constructional Features of British Trucks



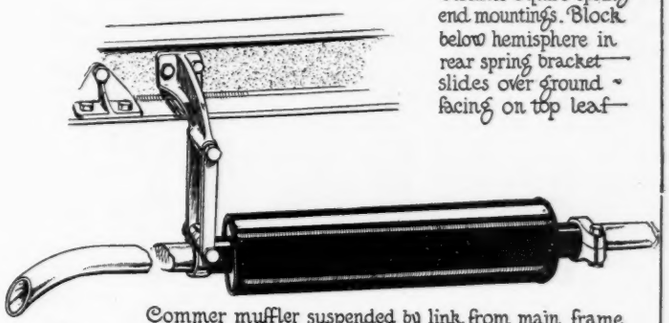
Rear end of Straker-Squire Crossmember is steel forging, outer ends carrying brackets of springs Pressed steel frame members have channels outward



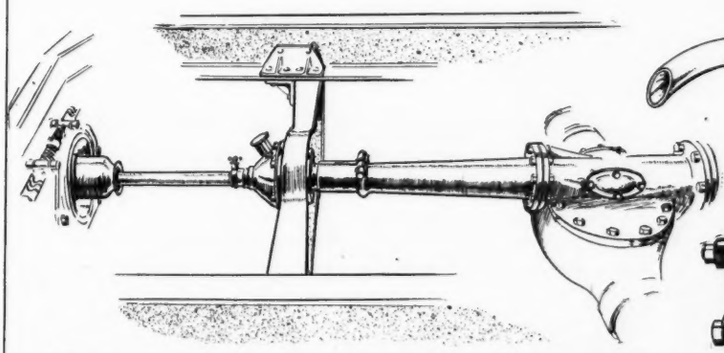
Straker-Squire spring end mountings. Block below hemisphere in rear spring bracket slides over ground facing on top leaf



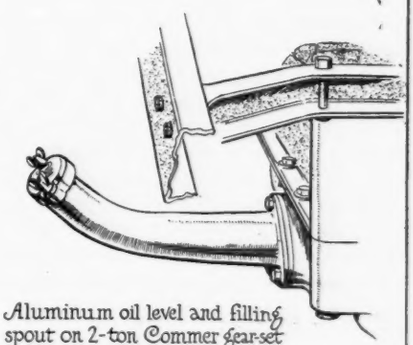
Sight oil feed on dash of Commer truck, full delivery of pump passes through glass ended casing and flows thence by gravity to crankcase troughs.



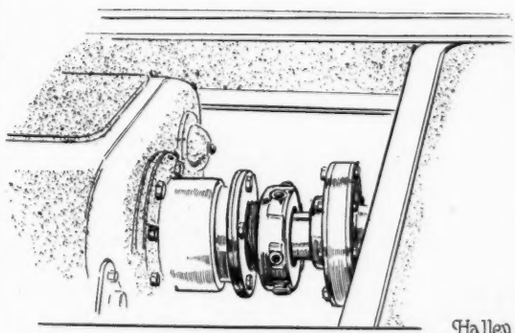
Commer muffler suspended by link from main frame to allow for expansion of exhaust pipe



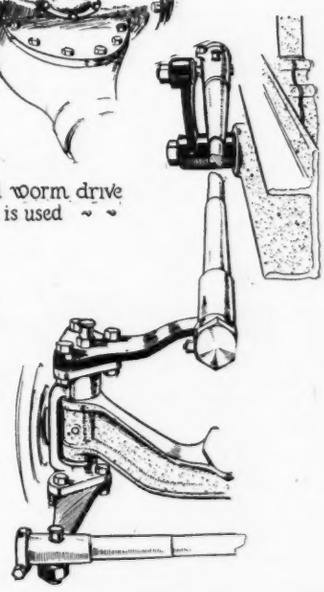
Commer semi-enclosed drive shaft and overhead worm drive
A transmission brake of 8-inch diameter and 4-inch face is used



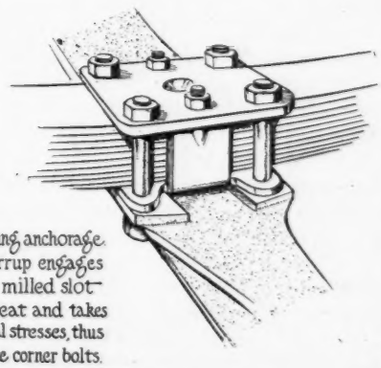
Aluminum oil level and filling spout on 2-ton Commer gear-set



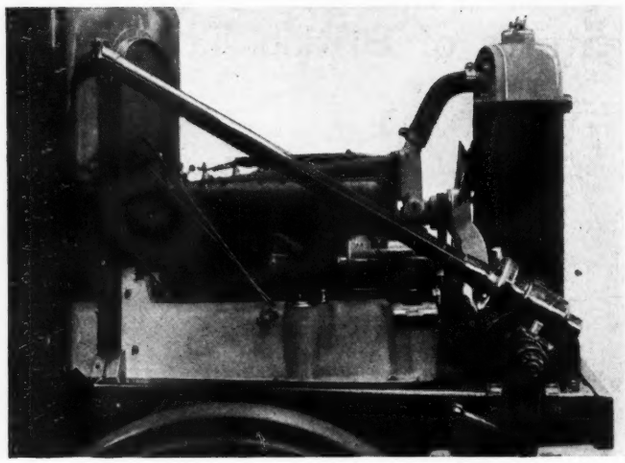
Adjustable packing glands are fitted at front and rear of main shaft of gear-set in new Albion truck



Halley steering connections and levers, latter secured to swivel axle by three bolts. Left swivel interchangeable, but has triangular cap instead of top lever Note upstanding lever on worm shaft, allowing bigger lock for front wheels



Dennis spring anchorage. Central stirrup engages transverse milled slot in spring seat and takes longitudinal stresses, thus relieving the corner bolts.



Austin block cast, 3¾ x 5 in., engine. Steering column extended outside hood to front end of frame

being practically identical with that of the Austin touring car. The block cast cylinders have a detachable L head and are mounted on the aluminum crankcase, the lower half of which embodies the housings for the crankshaft bearings. The power unit is supported at three points the gearset providing four speeds with a central lever which slides across the gate cast in one piece with the lid of the box. An extension of the gear lever gate supports a transverse shaft, which has right and left-hand square threads at each end, and serves to contract the shoes of the transmission brake when partially rotated by pedal actuation.

The propeller shaft is tubular, 90 in. long and 3 in. in diameter, with a star joint at the front and a sliding block joint at the rear. The overhead worm is carried in the center piece of the three-part axle, which is divided vertically at each side of the worm casing. The extensions are tapered and of cast steel and carry the wheels on their outer ends. The exposed expanding rear wheel brakes are cable operated and are actuated by a hand lever bolted to the right-hand frame member.

The pressed steel frame, 7 in. deep by 2½ in. wide, has five cross members of pressed steel. One is of banjo pattern and is placed in front of the rear axle, with the propeller shaft passing through its center. This chassis is sold at $3,625. Novel features are the use of wood wheels and the prolongation of the steering column, so that the box is carried at the front right-hand corner of the frame, the column passing outside the hood.

7. 2½-Ton Dennis

The pressed steel frame of the Dennis chassis is exceptionally stiff for a truck of this load capacity, being 7 in. deep x 2½ in. wide and 5/16 in. thick. Pair cast cylinders with T heads and inclosed valves are used for the 4⅛ x 6-in. engine, which has trough lubrication, pump water circulation and a fan driven by a 1¾-in. flat belt behind the vertical type gilled tube radiator. A single plate clutch is used, the coupling shaft to the four-speed gearset having flexible joints formed at each end, the latter being spherical with a series of half sunk steel balls engaging with grooves in the driving and driven casings attached to clutch shaft and gear shaft respectively. A central sliding gate change is arranged in front of the gearset. The latter is supported by two pressed steel cross members and has its main shaft over its lay shaft. A contracting type brake is attached to the rear of the transmission.

Ball-bearing star-type universal joints are used at each end of the open propeller shaft, which is coupled to an overhead worm assembled as a unit with the worm wheel on the top plate of the cast axle center. The axle casing has bolted-on extensions carrying the wheels on floating bushes, while the rear brakes operate within open-sided drums attached to the cast steel, hollow-spoked wheels. Chassis price is $4,800.

8. 30-Cwt. Vulcan

The four-cylinder 3½ x 5⅛-in. L head engine has its cylinders cast as a block and mounted on the aluminum crankcase, which has supporting arms with web connections. Lubrication is by the trough system, the gear type pump being driven by bevel gearing from the camshaft, and located alongside the latter on the top half of the crankcase.

The water pump is driven by a dog coupling from the distribution gearing. Its shaft is extended to carry the flexible joint by means of which the magneto is driven.

Between the fabric-faced cone clutch and the four-speed gearset, which is separately mounted on the main frame, is a universally jointed coupling shaft with fabric disk joints. The shafts in the gearcase are carried on ball-bearings, the gear sleeves being operated by a central sliding lever in a gate formed as a unit with the top half of the casing. A contracting type brake is used at the rear end of the main shaft, whence the drive is taken through an open propeller shaft with star type universal joints having plain bushes. Final drive is by worm gearing within the full floating back axle. The rear wheels are carried by floating bushes. Inclosed expanding type brakes are attached to the web-cast steel wheels, which are fitted as standard with either solid or pneumatic tires. The price of this chassis with solid tires is $3,360.

A Tribute to American Motorcycles

THE statement was made by C. H. Lang, a Harley-Davidson dealer who has returned recently from England, that after thoroughly investigating a number of foreign motorcycling manufacturing plants, he is convinced that the American motorcycle is distinctly superior from an engineering and technical standpoint to any foreign machine. Such praise, though merited, loses some force as coming from one who might be expected to be in a frame of mind favorable to such conviction.

An interesting corroboration of this statement, however, appears in the London Times in an article commenting on the English motorcycle show. "For the first time," the London Times says, "will one be able to see a deliberate intention to enter into competition with America in producing a motorcycle capable of going anywhere and giving good service under conditions of ill-usage, overloading and neglect."

This shows a very high regard for the workmanship of the American motorcycle. It attributes to the American product, in fact, desirable attributes which even American manufacturers might hesitate to claim. When a motorcycle is produced which will continue to give good service "under conditions of ill-usage, overloading and neglect" we may reasonably expect to see one which will operate without fuel. Nevertheless, the compliment to the American machine is worthy of note.

THE Federal Department of Labor has undertaken a survey of sixty-five industrial cities of this country to determine the present unemployment. The classifications used in the census reports will be used for this work and the results should be announced Jan. 15.

An Internally Trussed Commercial Plane of American Design

The bat-wing plane developed during the war is adapted to commercial use in the Stout three-passenger aerial sedan. Ingenious plywood construction eliminates all wires and gives low wing loadings with high factor of safety. Wood wing covering, floor boards and seats utilized as structural parts. Complete enclosure, clear vision and other provisions for comfort and safety of pilot and passengers. Landing speed 40 miles an hour and maximum speed of 120 miles. Low maintenance and operating costs are claimed with 14 miles per gallon of fuel consumed.

FLYING tests have just been completed by the Stout Engineering Laboratories on their new commercial type monoplane, an enclosed aerial sedan, which is a further development of the so-called bat-wing machine built by Mr. Stout for the government during the war.

This machine is a three-passenger, completely enclosed, internally trussed monoplane, having the wing mounted on either side and above the fuselage. It differs from previous airplanes in that the wings extend almost to full length of the fuselage at the center, though they taper to a very small chord at the tips.

The machine is built entirely of wood, even the wings being covered with very thin three-ply wood, glued on in panels. The wings are trussed inside with six lattice girders, also of wood and veneer construction, with the wing surfacing and batten ribs connecting the spars forming a unit monocoque wing said to be of unusual strength in proportion to its weight. While the weight is the same as that of most biplanes, the factor of safety is claimed to be more than doubled.

According to the designer, "the completed ship, while having 30 sq. ft. more than the German Junker airplane, which is its nearest prototype, weighs almost 400 lb. less, while its structural strength by calculation is easily doubled. The total ship weighs 1940 lb., empty, as against 2380 lb. for the German ship. Its landing speed, however, is 10 miles less and its maximum speed greater than that of the German plane. In the flying tests the plane flew at a maximum speed close to 120 miles an hour, yet made landings at 40 miles per hour."

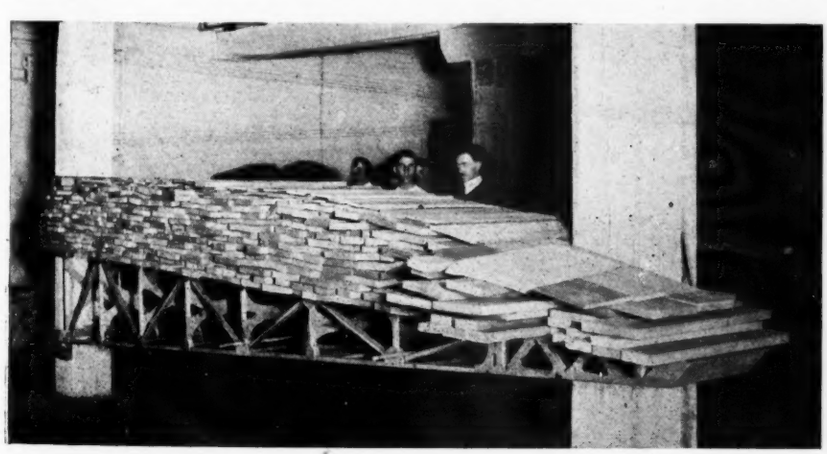
With the machine fully loaded, the wing loading is about 8 lb. per sq. ft., and the plane takes off the ground at about 50 miles per hour. It has a cruising radius of 5 hours. Its factor of safety is 8, and, in all fittings, 10.

The fuselage is of streamline form, built entirely of veneer. The first part of the structure is a keel, running fore and aft, to which are fitted bulkheads at specified distances in proportion to the stresses. These bulkheads are connected by battens or wooden strips, running fore and aft, and to which the outside veneer is glued. This makes the entire fuselage, when completed and glued up with water-proof glue, practically a one-piece structure. The seats, flooring, etc., serve as a part of the structure, as well as for their normal uses.

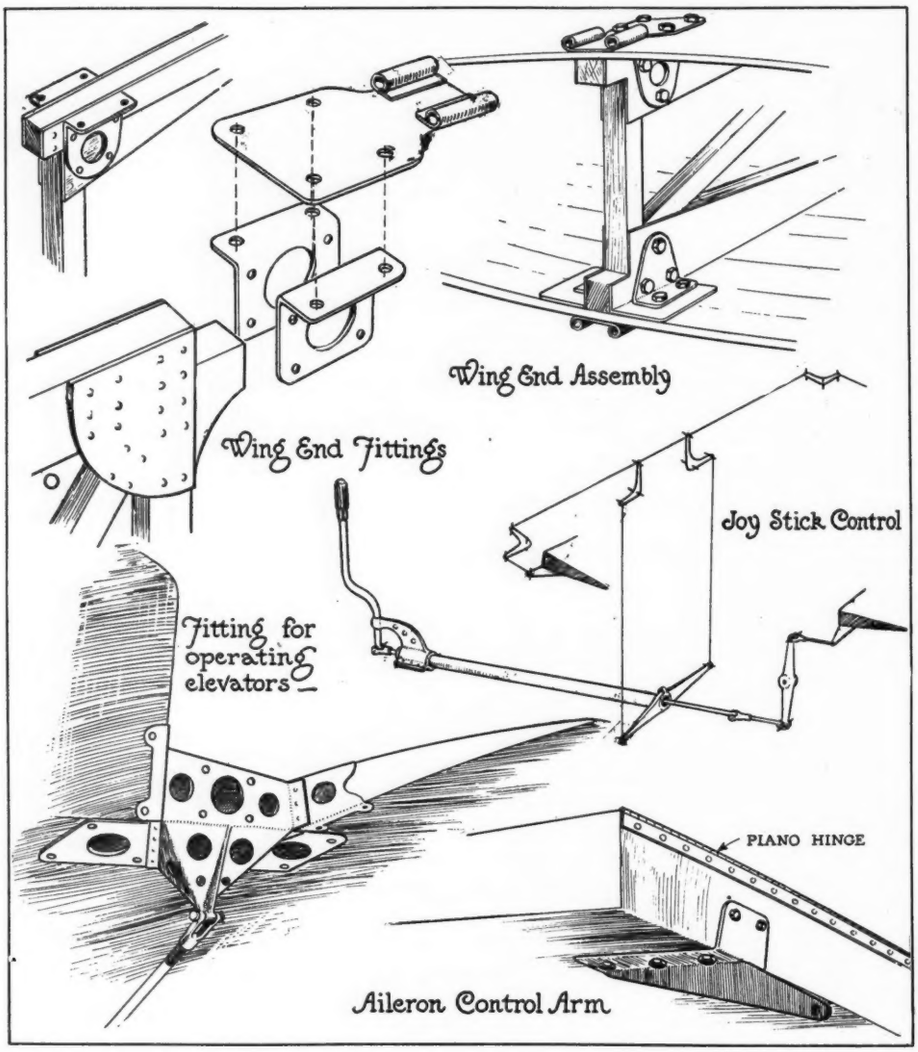
The wings are attached at the top of the fuselage. Their maximum depth is 17 in. The six spars formed of veneer sections are made up of spruce combined with plywood gussets into the form of a double Pratt truss. These spars taper with the wing from the root, or fuselage end, to the tip, so that the wing curve is kept constant throughout, and yet all spars are straight members.

The spars weigh only 10½ lb. each. The combination of the ribs and plywood in the form of the wing curve fore and aft reinforces the spar enormously, in forming the whole wing into a sort of reinforced tube which practically gives double the strength of the spars alone. Additional wing compression members are added on top at the points where the maximum stresses occur. All drift is taken by the veneer covering itself, the factor of safety in this direction running into the hundreds.

The control surfaces are built in the same manner as the wings, with tapered spars of wood and veneer glued on the outside. The stabilizer area at the rear is adjustable while in flight. The rudder is a continuation of the flat sides of the fuselage at the rear, and hence has considerable action in proportion to its surface, so that by counterbalancing it, for a comparatively small effort on the part of the pilot it has more



Spars for Stout plane weighing 10.5 lb. Each pair is tested under a load of 2500 lb., as shown by this illustration. The spars are supported only at the root, as shown at the left



than the usual effect, even on this fuselage, which is much shorter than on the usual airplane. The machine can be turned about in almost its own length while taxi-ing on the ground.

There are no wires or turnbuckles in the plane, nor need any adjustment be made after flight, except as relates to engine performance. All controls are push-and-pull tubing, with bell-cranks and ball joints where needed.

The seating arrangement is rather unusual, the pilot sitting forward, just to the rear of the engine. There is a wire-glass window just over the engine hood, as in automobile practice, through which the pilot gets his forward vision. On his right and left, opposite his eyes, are the wings, and looking down on either side he gets a clear vision of the ground for landing. For vision above, an overhead window is provided.

Back of the pilot and a step lower down, is the floor of the body proper, with a door on either side, as in motor car practice, these doors being close enough to the ground when the ship is at rest so that passengers can step directly from the ground into the body without using a ladder.

The two passengers sit side by side opposite the windows, just to the rear of these doors, thus making a three-window arrangement on each side of the fuselage, the central windows being in the doors. Just back of these windows is a round porthole for inspecting the controls and rudder at the rear end of the fuselage.

The control is by the usual joy stick; and the aileron, elevator and rudder arrangements are standard, as are also the engine controls. Added features are an electric starter button on the floor, and a primer on the dash.

The powerplant is a Packard eight-cylinder aviation engine, with many new installation features. As a fire preventive, the carbureter is located below the crankcase and the air intake into the carbureter is led completely outboard, so that any backfire from the engine will be conducted outside the fuselage.

The gasoline lines have flexible connections throughout, so that vibration will not affect them. The tanks are 12 ft. away from the engine, in the wings on each side of the pilot, and the gasoline gage is directly in his line of vision. A loop is provided in the gas line so that if there is any leakage in the tank the gas will run down the pipe and drip onto the floor beside the pilot, and the leakage be detected immediately. The feed is by gravity alone, with a head of almost 5 ft.

The landing gear is of more or less conventional type, but on account of the wing clearance from the ground, it has been possible to arrange for more length in the rubber bands than is possible in the usual biplanes, thus making for far greater landing safety in rough places.

The propeller is of birch wood and is made specially

©Underwood & Underwood.

Stout aerial sedan about to take-off on its trial trip
(Insert) Stout aerial sedan in flight

for this machine by the American Propeller and Manufacturing Co. It is 8 ft. 6 in. in diameter and gives an air speed of 120 m.p.h. at 1700 r.p.m.

All of the fittings are ingeniously designed and are made up of cold-rolled stock, a commercial material always easily obtainable, rather than of high tensile alloys of which deliveries are sometimes uncertain.

The major feature of the plane, outside of its all-wood construction, is the extreme length of its chord at the center of the machine. It has, in fact, more of a "butterfly" plan view than a "bird" outline, but by this means increased area is obtained within a small space.

William B. Stout, designer of the plane described herewith, was formerly on the editorial staff of *Motor Age*, one of the Class Journal publications. From this work he entered the manufacturing field, acting on the engineering staff of the Scripps-Booth and Packard companies, being chief engineer of the aircraft department of the latter.

During the war Mr. Stout was technical advisor to the Aircraft Board at Washington, and since his release from these duties has been engaged on the development of his internally trussed wing plane. The plane described in this article is the third of the series developed.

The Stout plane is now ready to make further tests, as the weather permits. Work is also in progress on the all-metal airplanes of much larger size which this firm is building for the Navy.

Curtiss Eagle Commercial Plane With Liberty Engine

WE show herewith a photograph of the Eagle commercial plane of the Curtiss Aeroplane & Motor Corp., fitted with a 400-hp. Liberty engine. This plane is capable of carrying ten persons or three-quarters of a ton of freight at the rate of 105 m.p.h. for a non-stop flight of ten hours' duration.

This new type of aerial carrier flown by Bert Acosta in several test flights, carried aloft a useful load of 3533 lb. or 9 lb. per hp., which useful load-horsepower ratio is said to mark a distinct advance in airplane performance. The trials were witnessed by Brigadier-General William Mitchell of the U. S. Air Service. A fuel supply of 1500 lb. (600 gal.) was carried. This is sufficient for a flight of ten hours' duration. A speed of 105 m.p.h. was made with full load. The landing speed is approximately 50 m.p.h. with full load. This is lower than that of most two-passenger machines. The ceiling is 10,000 ft. with full load.

The Crutiss Eagle was designed to meet three specific requirements of flying. One was the need suggested by such air transport as the United States Aerial Mail Service for airplanes which could carry large quantities of mail over long distances. Another was the ever increasing demand for a large-capacity airplane for the economical commercial and military transportation of freight or passengers. The third was for ambulance service.

The Eagle has every appointment possessed by the high-class limousine. Entrance is made through a side door reached by means of removable steps. The enclosed compartment is finished in leather, with eight individual leather-upholstered seats, staggered to permit easy movability and is provided with dome lights. Curtained windows of celluloid give free vision and protection from wind and noise at the same time. There is a compartment for luggage to the rear of the passenger cabin. The entire cabin space can be easily converted and utilized for freight carrying.

The body or fuselage is built of ply wood, in monocoque form, and combines lightness with strength and solidity. Streamlining similar to that of the Curtiss Oriole and Wasp is maintained, the fuselage holding the single motor in front, widening into the passenger cabin and narrowing toward the tail.

The landing gear is designed to take up shocks in landing. It is composed of two sets of wheels arranged in tandem. Following are the chief dimensions of the plane: Length, 36 ft. 9 in.; width, 61 ft. 4 in.; height, 12 ft. 4 in.; gross weight, 7423 lb.; useful load, 3533 lb.

The Curtiss Liberty-motored Eagle

Use of Tungsten in High Speed Steel

THE bulk of the world's tungsten is used for the manufacture of steel, and especially for that brand known as high speed steel. It was at the World's Fair in Paris, in 1900, that the first cutting tools made from this steel were publicly exhibited. The increasing hardness of the metals and metallic alloys used in the industries called for the creation of new tool equipment. Thanks to tungsten steel, it is now possible to easily work the hardest metals, and to multiply the production capacity of machine tools by permitting them to operate at a materially increased speed.

In 1911 an American automobile manufacturer, in the course of a conference, made the remark that the substitution of high speed steel for the old carbon steel tools had enabled him to increase his production five-fold, and reduced the cost price of his chassis by $200. High speed steel, however, can be employed only on heavy machines designed for high speed work, and manufacturers generally hastened to modify their old tool equipment.

IN an address before the National Rivers and Harbors Congress, Secretary Alexander said: "The improvements of our rivers and harbors and their relation to our commerce, domestic and foreign, has been the subject of academic discussion for many decades. But as time goes by and the need for more adequate and economic means of transportation becomes more apparent and pressing, the more insistent should be our demand that the great projects already undertaken should be carried forward consistently and without interruption.

Atwater Kent Starting and Lighting on Packard Six

Die-cast aluminum used to save weight. Third brush regulation and Bendix drive employed. Parts are simple and substantial and in some cases specially made for this application. Particular attention has been paid to proper lubrication. Double wiping contact provided in cutout.

By J. Edward Schipper

THE Atwater Kent starting and lighting equipment recently adopted by the Packard Motor Car Co. as standard equipment for the new Packard single six represents some interesting points in electrical development as applied to automotive equipment. It is a two unit system, for operation on 6 volts. The generator is shunt wound and employs the third brush method of regulation. With the starting motor is used the standard Bendix drive on a 10-tooth pinion. An effort has been made to do away with all delicate adjustments and parts and to maintain light weight in both units. Consequently the use of aluminum die castings has been resorted to in a great many parts, including the brush end head on both the starting motor and the generator, and the drive end head on the generator.

The Starting Motor

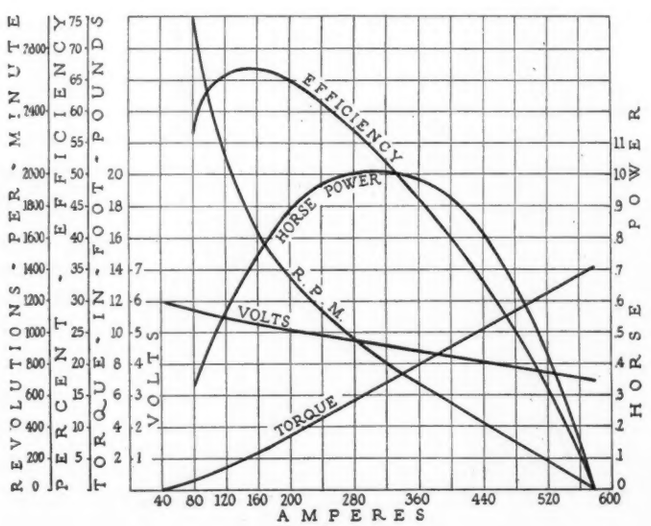
The starting motor is 4¼ in. in diameter, 14½ in. in length overall and weighs 22¾ lb. A special barrel mounting is used. The generator weighs 19¾ lb., is 4½ in. in diameter and 9½ in. long, excluding the drive shaft extension. It is mounted by means of a special flange. The generator size was determined by the requirements of an unusually low cut-in point, and at the same time to permit of continuous maximum output at safe temperatures.

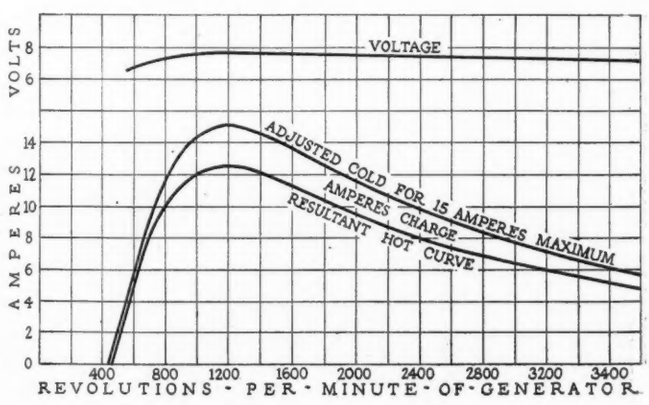
The material used in the shells is 10 per cent carbon steel tubing. The pole shoes used are made from rolled stock, with ground surfaces. The pole piece contours are held to very close limits in order to insure uniformity in electrical characteristics and reduce the possibility of magnetic hum. In the armature assembly, the shafts are carefully heat treated and accurately ground. The laminations are made of sheet steel punchings individually keyed to the shaft, and forced on under pressure. The armature windings are impregnated and oil slingers and other precautions have been taken in the generator to prevent oil from working through to the commutator and brushes.

Three bronze bearings are employed in the starting motor and a ball bearing in the brush end head of the generator. There is no bearing integral with the generator at the drive end head, because of the unique method of drive employed by the Packard company. The generator head is machined to fit an auxiliary bronze bearing plate which accurately centers the generator shaft, and, in addition to furnishing a large bearing surface, carries the thrust of the generator shaft sprocket which fits over the splined portion of the shaft, as shown in the illustration. The sprocket is not a force fit, but is held in place by the pressure of the coil spring in the front of the gearcase. The complete unit is located by the single stud bolt at the bottom and is free to swing about this as an axis before clamping in place with the proper center distances.

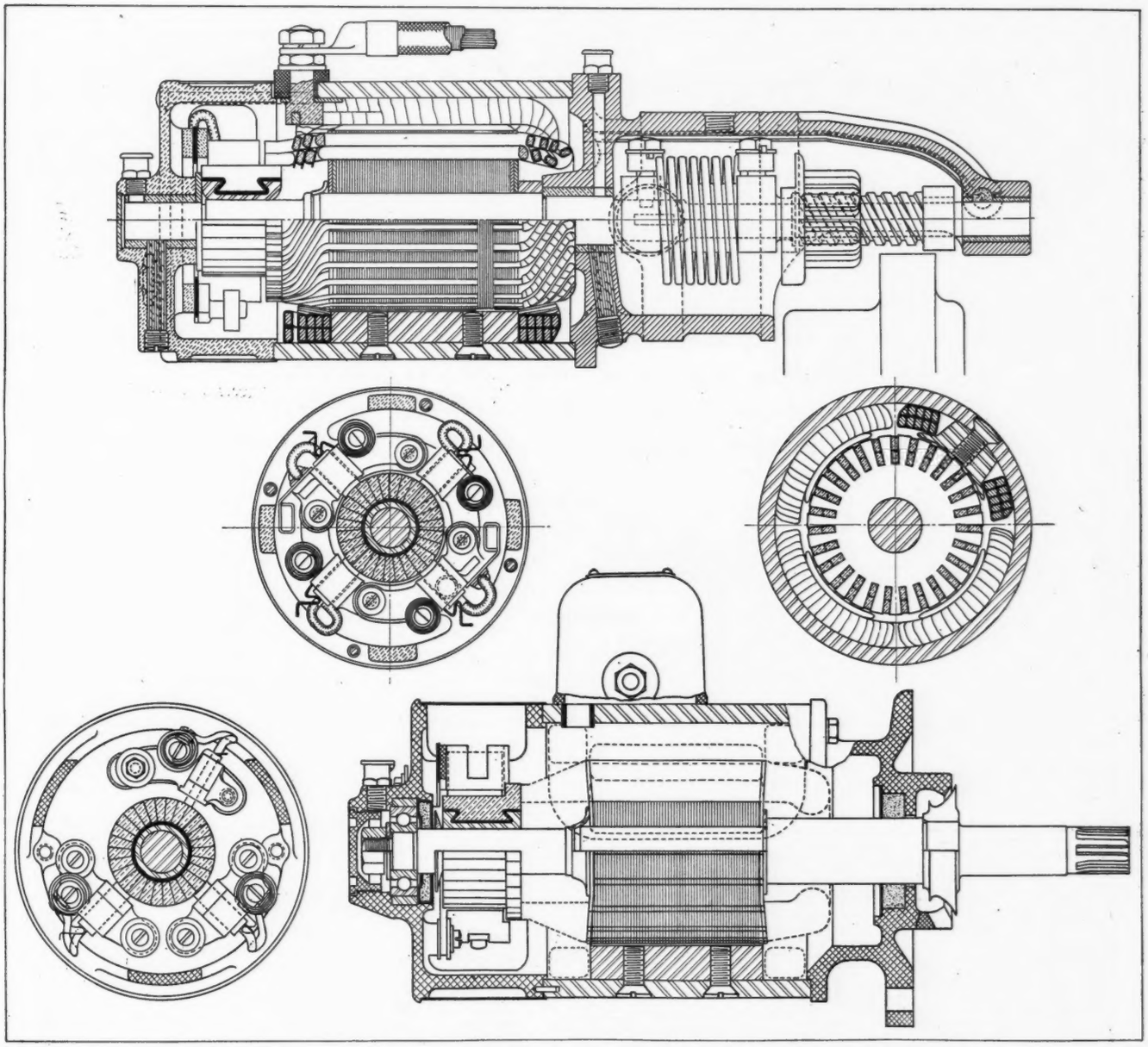
Lubrication

A great deal of thought has been given to lubrication. The generator is equipped with an oil cup and bearing felt at the brush end head. In the starting motor, there are two oil cups, one at each main bearing. Provision for




VOLTS
AMPERES
VOLTAGE
ADJUSTED COLD FOR 15 AMPERES MAXIMUM
AMPERES CHARGE
RESULTANT HOT CURVE
400 800 1200 1600 2000 2400 2800 3200 3400
REVOLUTIONS · PER · MINUTE · OF · GENERATOR

To the left—Characteristic performance curves of starting motor. Above—Curves showing output of generator at various speeds



Sectional views of Atwater Kent starting motor and generator used on Packard chassis

oiling the outboard bearing is made by means of a tube connected with the intermediate head, and fitted in a groove on the inner surface of the outboard housing.

The brushes used in both the generator and starting motor are held in place by aluminum die-cast brush holders. Pigtails securely fastened to the brushes are used. In the generator, the spring tension and the size and composition of the brushes is such that the wear on the brushes and commutator has been found negligible after 5000 hr. continuous running at maximum output. The third brush on the generator is easily accessible and, having both an inside and outside adjustment, a wide range of output is obtainable.

The cutout assembly, with reverse current relay, is mounted on the generator. A wiping contact is provided and the contact points are double. A phosphor bronze spring supplies the tension. Cutout cover is a die casting.

The generator characteristics are shown in the accompanying curve. Considering the size of the generator, the slight difference between hot and cold output is worthy of note. The unusually low cut-in point, and the rapid rise in output are obtained without sacrificing any desirable characteristics. It will be seen that after reaching the maximum output at approximately 1300 r.p.m., the curve droops very slowly, furnishing a substantial charging current at fairly high speeds.

The starting motor attains its maximum efficiency at about 1700 r.p.m. and develops 1.15 hp, at 650 r.p.m. The stall torque is rated at 16 lb.-ft.

The starting switch was designed especially for the Packard car, and considerable aluminum is used in its construction. The switch housing is mounted on a sherardized steel plate which in turn is bolted to the flywheel housing of the crankcase. A third terminal is provided for the ammeter connection.

Style and finish of the Atwater Kent equipment are plain but serviceable. The aluminum heads are sand blasted and the shells are finished in smooth, hard, black enamel. After final assembly, every machine undergoes a 24 hour test run. Generators are tested for output adjustment, charging current, noise and magnetic hum, as well as temperature rise under adverse conditions. All starting motors are tested for stall torque, current consumption and efficiency before shipping.

New Continental Cars Shown at Olympia

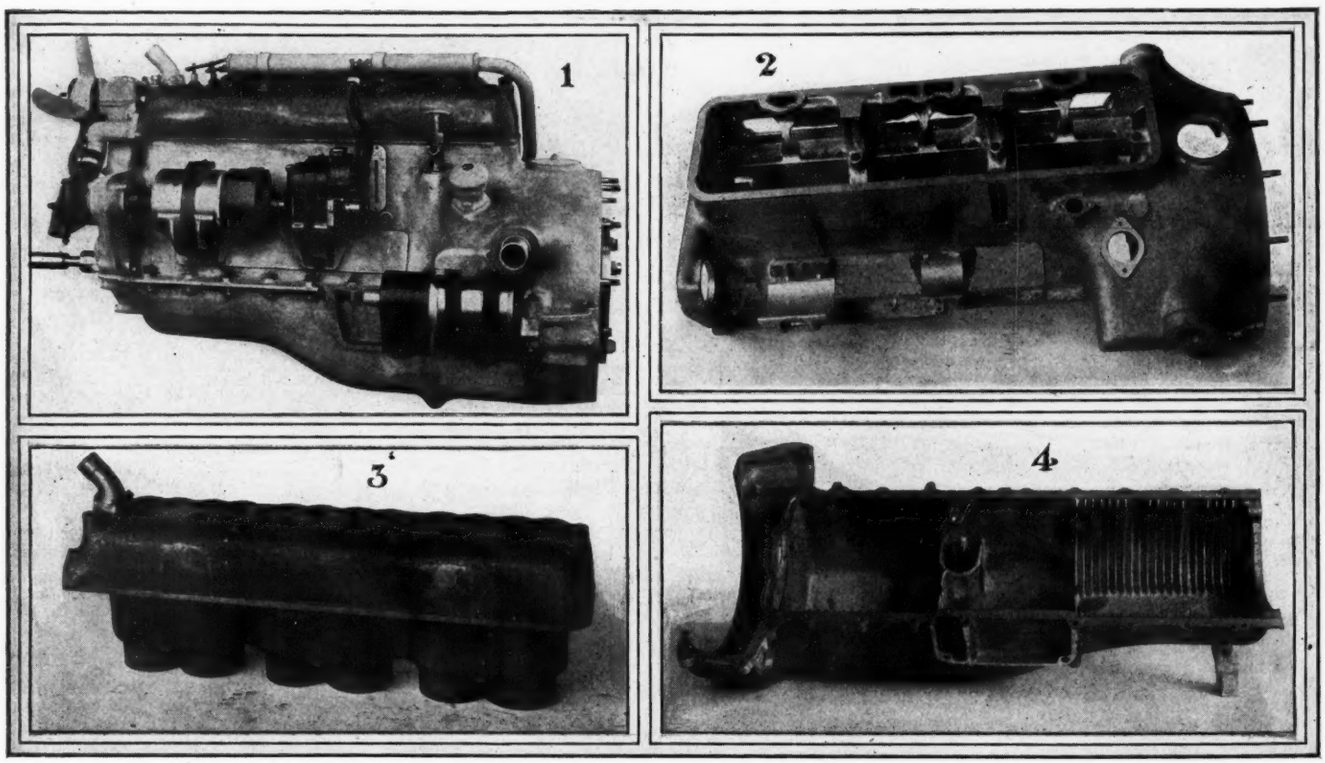
Present marked contrast with British design, especially in use of four-wheel brakes, battery ignition, and preference for cantilever springs, detachable cylinder heads and unit powerplants. Spyker bristles with novelties. Clean design features the new Spa and the Isotta. New S.L.I.M. uses air for starting and for operating brakes. Valve-in-head gaining. Aluminum dashboard common. Several fan-clutches employed. No external brakes are used, and transmission brake is being abandoned.

By W. F. Bradley

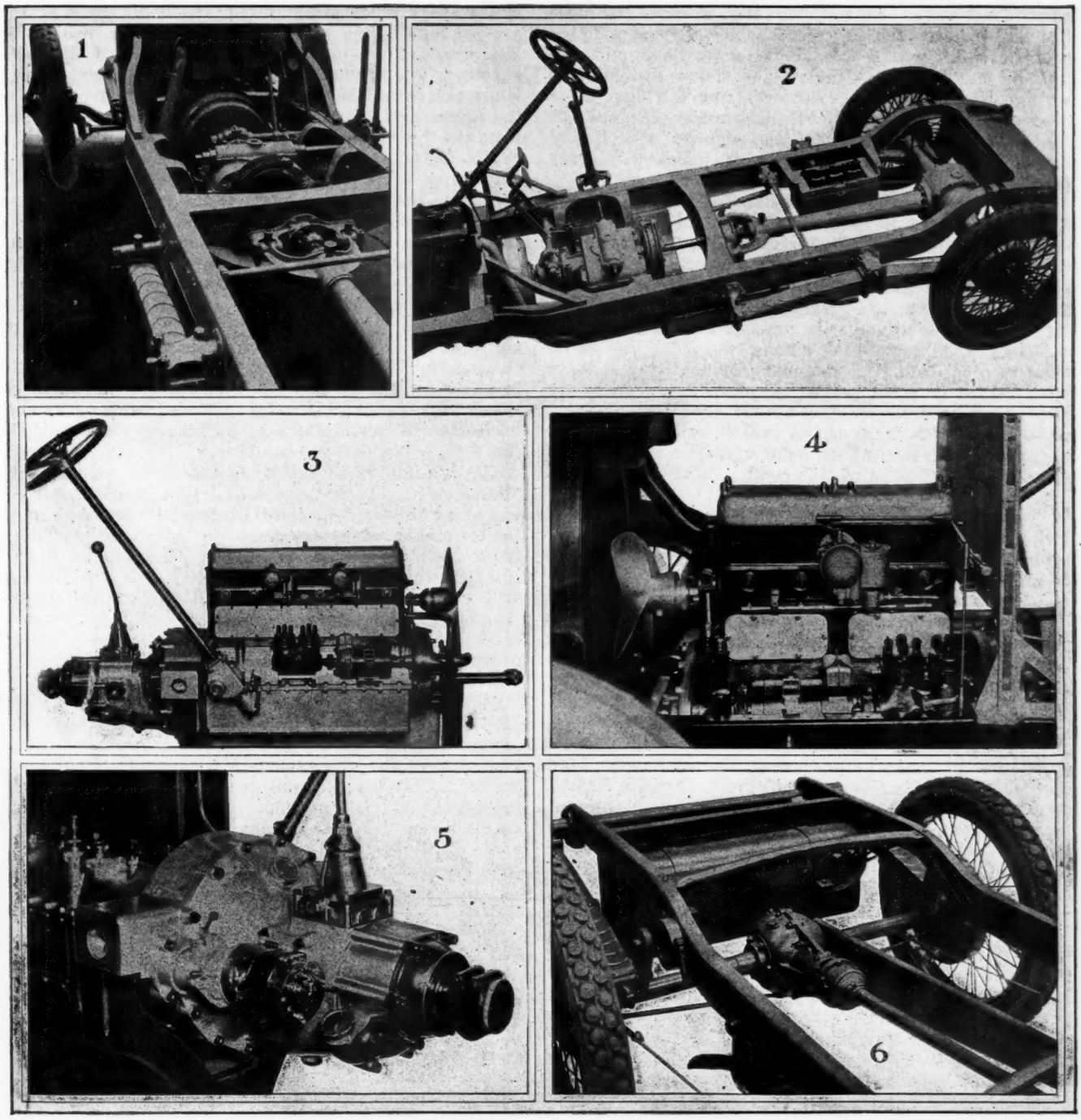
CONTINENTAL maufacturers brought forward few novelties at the London show. In the cheap car field the most prominent exhibitor was Citroen, who has succeeded, since the armistice, in securing a strong position on the British market. The fact is worth mentioning that Citroen's selling interests in Great Britain are in American hands and the more modern and vigorous methods employed are doubtless responsible in a large degree for the success of this new firm in breaking into foreign territory so quickly.

Bellanger exhibited his cheap car built on American lines. Renault and Berliet each had their popular-priced models seen at last year's Paris show, but they did not appear to attract any considerable amount of attention. It was noted that Lorraine-Dietrich and Bayard-Clement, who have joint interests and who have both laid out cheap production jobs, and had them on show a year ago in Paris, failed to appear in London, notwithstanding the fact that both had selling organizations here before the war.

Some surprise was expressed at the strong Italian representation. With the exception of Itala, who is re-



(1) Spyker six-cylinder engine. Note line drive of pump, generator and magneto. Back of magneto is crankcase scavenging pump and oil filler and breather. Note inclosed fan drive. (2) Top half of crank chamber of new Spyker six-cylinder engine, showing inlet ports. (3) New Spyker six-cylinder block. Note that cylinder barrels set into crank chamber. (4) Bottom half of crank chamber of new Spyker six-cylinder engine, showing internal cooling ribs



(1) *Close view of Hotchkiss yoke anchorage of torque tube, showing also cross members supporting gearset.* (2) *18/22 Hotchkiss, showing cantilever springs, four-speed gearbox and spiral bevel drive.* (3) *Powerplant of 35-hp. six-cylinder overhead-valve Gregoire, 3⅜ x 5⅛ in., with dual Delco ignition, twin carbureters, and sockets in aluminum arms for trunnion supports of rear end.* (4) *Overhead valve engine of 15-hp. Gregoire (3 x 5⅛ in.). Has Delco dual ignition.* (5) *Unit three-speed gearset mounting of new overhead-valve Gregoire. Delco starting motor operates through enclosed reduction gear to starter pinion. Rear end of unit supported by tubes extending from arms cast integral with clutch housing.* (6) *Rear end of Bugatti, showing quarter elliptic spring anchor, friction dampers above axle. The pressed steel torque member has wood filling and solid front end free to slide in hanging bracket on cross member of frame*

ported to have abandoned automobile construction, every Italian firm of note had models on exhibition. Fiat showed the three new types designed immediately after the war. Lancia exhibited his four-cylinder and stated that the new twelve, which was the novelty of the last Paris salon, was being held back until more favorable conditions prevailed. Spa showed a new six, and the Isotta-Fraschini company put forward a high-class eight-cylinder in line, which is just one year late in being produced. The other Italian firms showed the same type as last year.

Continental tendencies are different in many respects from those of Great Britain. French makers in particular are showing a strong preference for cantilever springs, and this in nearly all cases has been accompanied by the abandonment of the Hotchkiss drive. The

most conspicuous example is the French produced Hotchkiss car, which now has cantilevers and inclosed propeller shaft with a yoke at its forward end, and central drive. Unic has maintained drive through the springs, although using cantilevers, by the disposition of double cantilevers. No Italian maker has adopted cantilevers, but no maker in that country uses Hotchkiss drive, the propeller shaft being inclosed in every case and the drive being central.

Another important difference between Continental and English manufacturers is in the use of front wheel brakes, which have been taken up by the former, but do not seem to interest the latter. The present users of brakes on all four wheels are Delage, Hispano-Suiza, Excelsior, Bellanger, Isotta-Fraschini, Darracq and Piccard-Pictet. This number is going to increase very considerably within a year, among the adopters being Minerva, Spa, Unic, D.F.P. and Farman. Some of these firms will fit it to medium-priced chassis. Licenses are also being secured for the use of the Hispano-Suiza servo brake with front wheel brakes under the Perrot system. Arrangements are being made by two or three firms for the adoption of this combination.

Battery Ignition

English manufacturers are very reticent about the adoption of battery ignition, while French makers are taking to this very rapidly, and the number to use it will increase in the near future. At the present time Hispano-Suiza is using Delco on one of the most expensive chassis built in Europe. Darracq has dropped the magneto for its eight-cylinder model; Gregoire has put two new types on the market, one with four and the other with six cylinders, and both have dual Delco ignition. Lorraine-Dietrich has also decided that the magneto is unnecessary. Although these firms form a decided minority, their engineering standing is so high that they are certain to convert others. French makers do not appear to share with their English rivals the fear that the public will object to ignition by generator and battery.

In the matter of detachable cylinder heads French makers have taken a lead on English firms. Italy only remains true to the fixed head if considered on the basis of the number of firms, but is out and out for the separate head considered on quantity production, for all Fiat and Lancia cars have detachable heads, and Fiat alone represents about 75 per cent of the national output. The new Spa, a very high-class six, and the eight-cylinder Isotta-Fraschini both have detachable head.

Continental makers are coming more and more to unit construction of engine and gearbox, this also being a point on which they are not in agreement with English makers. The only Continental cars with separate engine and gearbox are those produced before the war and not modified since. With a few rare exceptions, one of which is the Farman, the post-war Continental productions have engine and gearbox in one unit.

New Features in Spyker

The only absolutely new Continental cars in the show are a Spyker six, a Spa six, an eight-cylinder in line Isotta-Fraschini and the French S.L.I.M. All these are expensive jobs produced almost irrespective of cost. The Spyker bristles with new features. The six cylinders, consisting of the heads, the barrels and the valve guides, form a monobloc casting, which is dropped into the aluminum base chamber, being held to it by eight bolts which support the main crankshaft bearings. The head is not detachable, and carries valve caps, into which spark plugs are screwed, and holes for a second set of plugs in the center of each cylinder head. The gas passages are cast in the upper half of the base-chamber, and communicate with the cylinder casting, while the carbureter is bolted on the lowest portion of the upper half of the crankcase, and draws all its air from the flywheel housing. On the left-hand side of the engine the water pump, generator and magneto have a single line drive, the pump being ahead of the timing gears and the two other parts to the rear of them. The electric starting motor is on the same side, but bolted to the lower half of the base chamber. Internal ribs are cast in the base chamber for cooling the oil, and another feature is a hand operated suction pump, mounted just back of the magneto, by means of which all the oil can be drawn out of the base chamber. Cooling is by pump, assisted by a four-blade aluminum fan with inclosed chain drive. The fan sprocket is mounted eccentrically, to allow for taking up slack in the chain, and a three-speed gear and a clutch are provided to take care of variations in temperature by varying the speed of the fan.

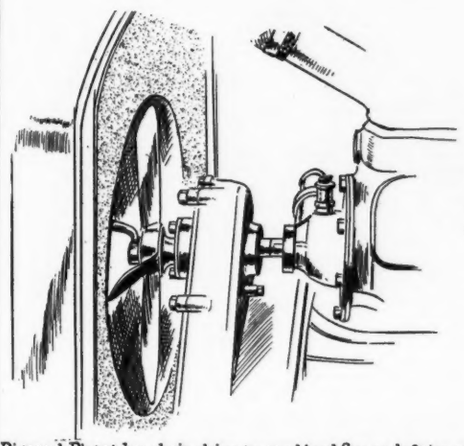
The two ignitions—battery and magneto—operate simultaneously. The battery distributor is driven off the end of a cross-shaft on the right-hand side of the engine, the terminals being very conveniently placed just below the valve stem inspection plates. The cylinder dimensions of the Spyker engine are 3¾ x 5 5/16 in. At 2200 r.p.m. the engine develops 70 hp., but all the endeavor of the designers has been to get high power at low and moderate speeds, so as to secure the maximum degree of flexibility. Three-point attachment of the engine into the frame is used, the forward attachment being spherical and the two rear ones by means of a heavy tube going through the crankcase housing with its ends received in bearings on the main frame members. A feature of the brake mechanism is the placing of the brake levers and the brake equalizer inside the rear axle housing. Although springs generally have increased in width on European cars, the record lies with Spyker, with a width of 3½ in. for the rear semi-elliptics, the ends of which are not shackled but guided between rollers.

Aluminum Construction in Spa

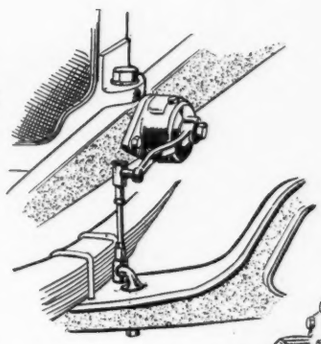
Unable to complete the car in time, Spa showed the engine of the new chassis only. This is distinctive by reason of an all aluminum construction. The cylinders and upper half of crankcase are a single aluminum casting, with steel liners pressed into the cylinder barrels. A detachable cast iron head is mounted on this casting, and the overhead camshaft is hidden by an aluminum cover. Although the camshaft is driven by a vertical shaft at the front, this is entirely inclosed by an aluminum cover the shape of which continues the lines of the main casting. The water pump is hidden inside this housing, and only two short lengths of copper pipe indicate the presence of a water circulating system. The fan is gear driven off the vertical shaft and is provided with a clutch and flexible coupling. This engine, which is one of the best examples of "clean" design to be found in the show, has 85 x 120 mm. cylinders. As an indication of the care taken to preserve the clean external appearance, the wires from the high tension magneto, driven from the same front cross-shaft as the generator, are carried through the cylinder head from the right-hand side to the plugs inclined below the valves on the opposite side of the engine, only about a couple of inches of wire being visible for each plug.

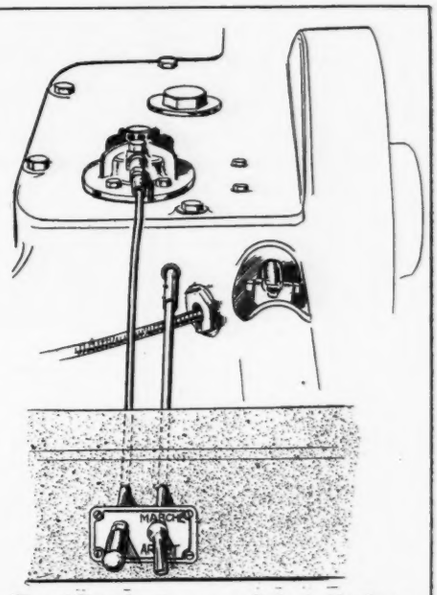
This engine will receive a unit gearbox, with change speed lever mounted on top. Details of chassis have not been issued, other than the use of front wheel brakes.

Mechanical Details of Continental Cars Shown at Olympia

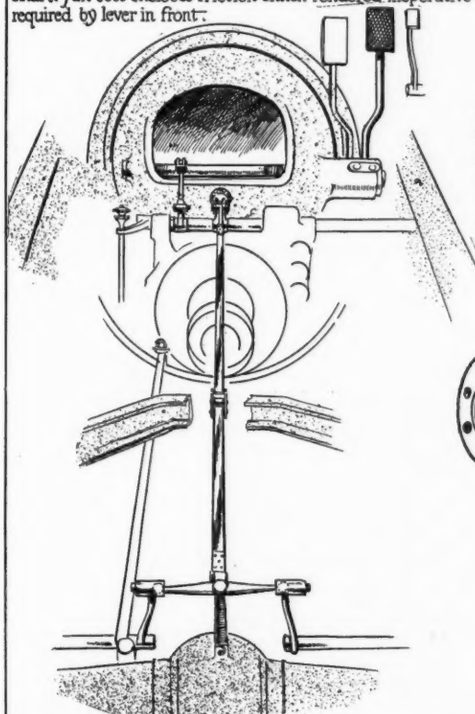


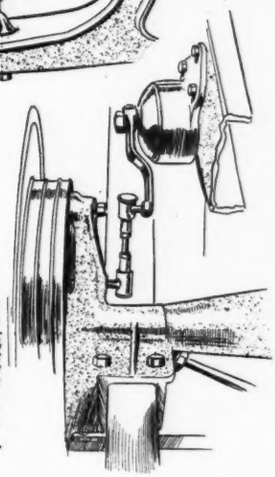
Piccard Pictet has chain drive to combined fan and water pump shaft. Fan boss encloses friction clutch rendered inoperative when required by lever in front.





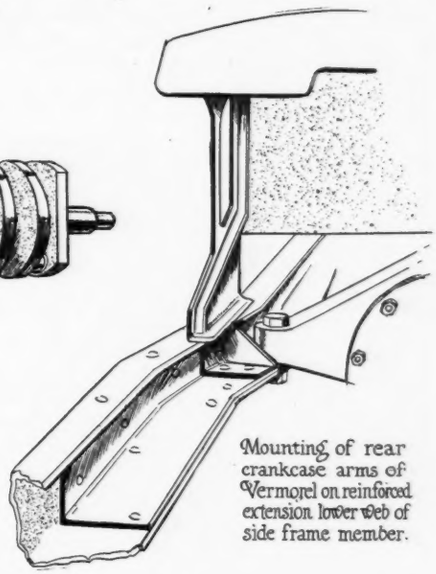
Piccard Pictet has tire pump cylinder inside gearset. Air outlet from exterior head has pipe to flexible tube connection outside frame; pump driving gear control also carried to lever outside frame.



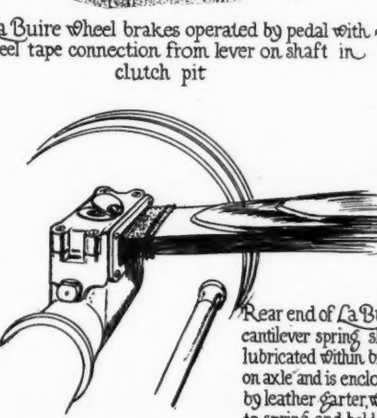


Feature of many Continental cars is standardized fitting of hydraulic spring dampers. Sketches indicate Piccard Pictet front and back fittings.

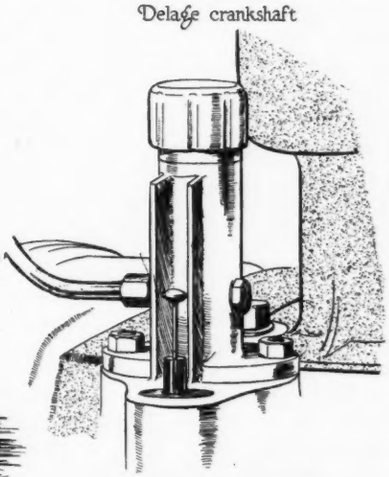
Delage crankshaft



Mounting of rear crankcase arms of Vermorel on reinforced extension lower web of side frame member.

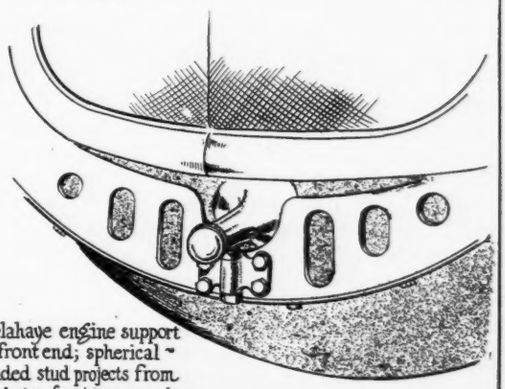


La Buire wheel brakes operated by pedal with steel tape connection from lever on shaft in clutch pit

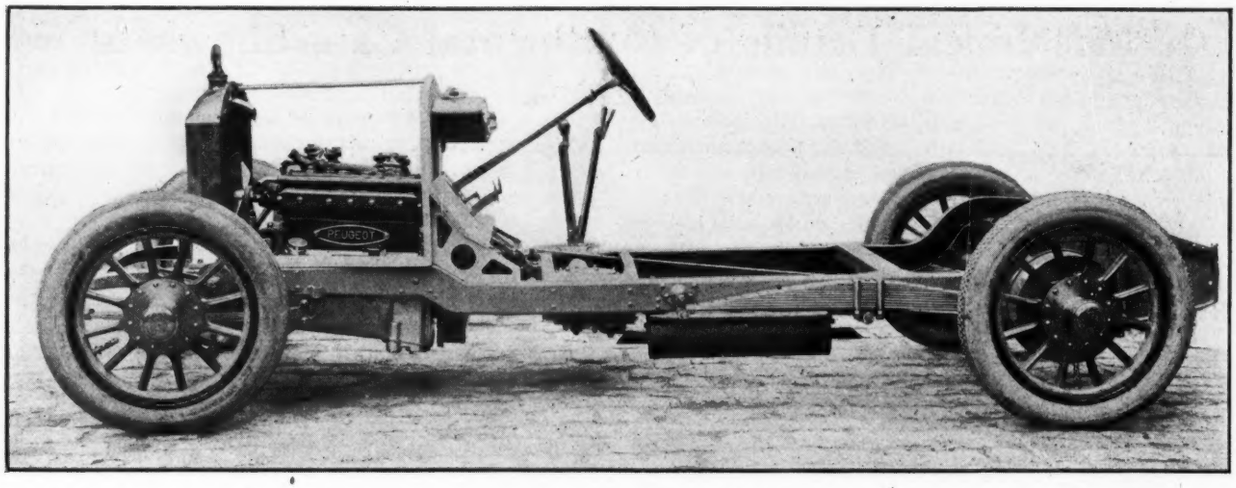


Vermorel has combined oil filler, breather and level indicator guide, also pipe from auxilliary oil tank for replenishing sump from driving seat.

Rear end of La Buire cantilever spring slides lubricated within bracket on axle and is enclosed by leather garter, wired to spring and held under flange plate on axle bracket.



Delahaye engine support at front end; spherical beaded stud projects from bracket on front crossmember.



16-hp. Peugeot, 3¼ x 5⅛ in. engine, four-speed gearbox under worm drive, disk clutch, 122-in. wheelbase. Price, £950

Clean external appearance is the distinctive feature of the eight-cylinder in line Isotta-Fraschini. Although Italian makers have always been famed for the "cleanness" of their design, there is nothing in existence to equal the Isotta in this respect. The eight cylinders measure 3.3 by 5.1 in., and have their valves in the detachable head with operation by inclosed pushrods and rockers hidden from view by a detachable head cover. The passages for the pushrods are in the cylinder casting, and so neat is the design that it is practically impossible to say, from an external examination, whether the valves are operated by an overhead or a crankcase camshaft. There are two Zenith carbureters placed on the right-hand side and fed from a vacuum tank. For appearance sake, the gasoline feed pipe from the dashboard tank is carried inside the aluminum cover plate hiding the lower portion of the cylinder barrels, so that only the unions and a couple of lengths of pipe, about 2 in. each, are visible. There is a similar arrangement for the ignition wires, which go inside the cylinder barrel cover plate and come out just below the plugs.

Isotta Chassis Details

The crankshaft, with bearings on both sides of each throw, and full circular webs, is a very fine piece of work. Aluminum pistons and hollow connecting rods are used, with an oil tube through each of the latter to the hollow piston pin. Unit construction of engine and gearbox is another new feature. Steering is on the right, with left-hand control. A Yale lock is incorporated with the gearset, so as to allow the gears to be locked when in engagement or in neutral. The rear axle is new, being a banjo-type steel stamping. The propeller shaft is inclosed, the drive being taken through the spherical end of the propeller shaft housing. Spiral bevel gears are used. Isotta-Fraschini was one of the first to adopt front-wheel brakes and has incorporated them in this new chassis. Whereas formerly the front-wheel brakes were operated separately by hand, now all four wheels are braked together, and the braking effort can be applied either by pedal or lever. Every part of the chassis not lubricated automatically is provided with a ball nipple lubricator to which grease is supplied by a screw type gun, on a system similar to that introduced by Alemite in the United States.

Marketed under the name S.L.I.M. is a new four-cylinder chassis produced at Lyons by the firm responsible for the Pilain car. The newcomer, which has 3.5 by 5.9-in. cylinders, with detachable head and overhead chain driven camshaft, is distinctive by reason of the use of compressed air for engine starting, for operating jacks, inflating tires and applying the brakes on all four wheels. The compressor used is a four-cylinder type of 1½-in. bore and stroke, driven by the engine with a reduction gear of 5 to 1. The compressed air is contained in two tanks placed at the rear of the chassis.

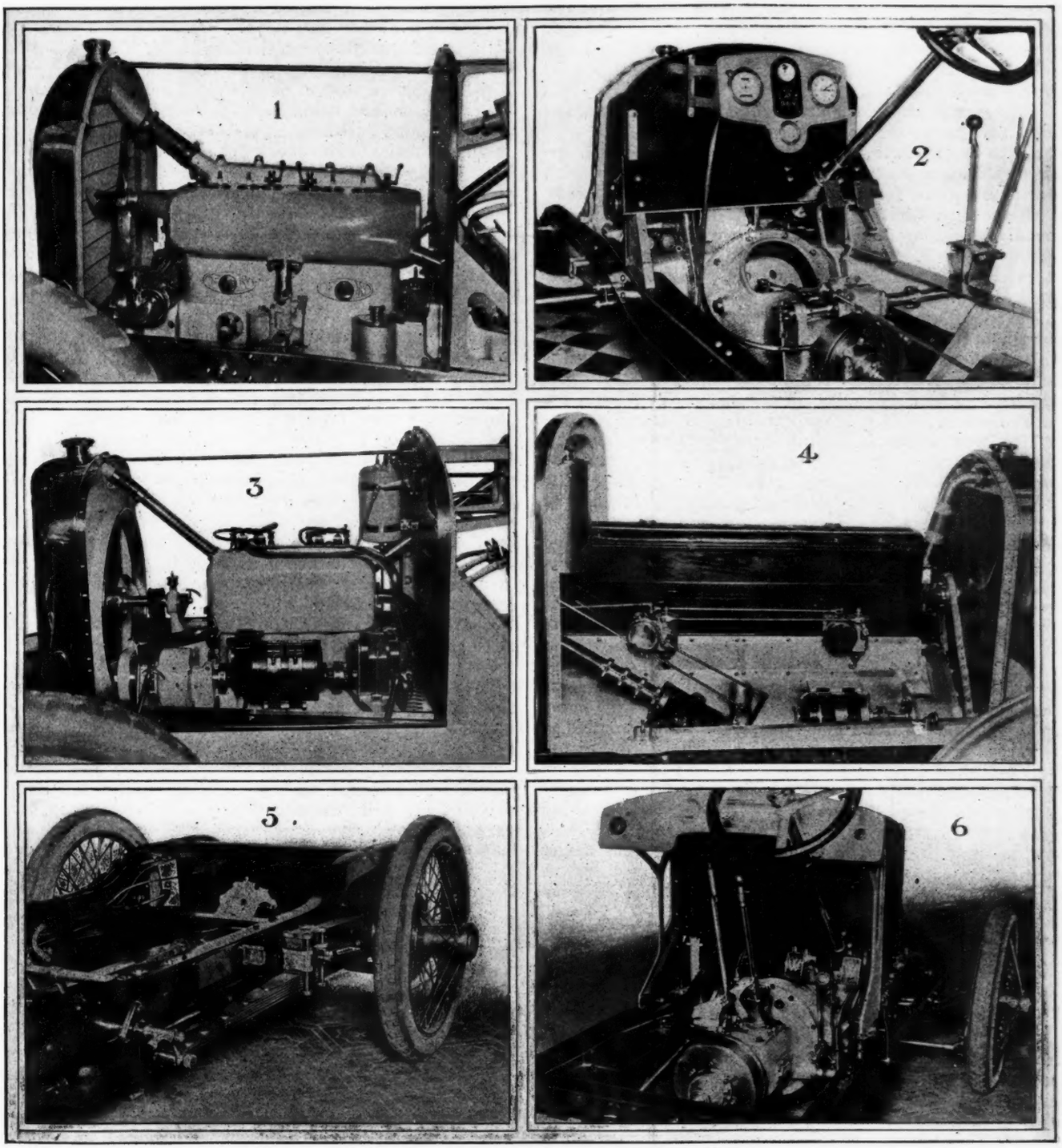
Cylinders and Valves

Exhibits at the London show are distinctive by reason of the immense amount of detail refinement they incorporate. Among the Continental exhibits the cast-iron cylinder is the type most extensively used, the majority having valves on one side and detachable head. The valve-in-head type, however, is making progress and is gaining ground at the expense of the L-head. There is only one example of steel cylinders, this being the high-grade Farman six, which is built on aviation lines with separate forged cylinders formed into a block by being welded to a base plate and to a head plate, a common sheet steel water jacket then being put round the unit. Hispano-Suiza has aluminum cylinders mounted on an aluminum crankcase, while the new six-cylinder Spa is the only one with aluminum cylinders and base-chamber in one casting. Even when a detachable head is used, it is comparatively rare for Continental makers to have cast iron cylinders and crankcase in one. In many cases the reason for this is that difficulty has been experienced in getting satisfactory castings.

In a few cases the push rods on L-head engines are placed inside the base-chamber. An example of this is the six-cylinder Schneider with detachable head. Cover plates on the side of the base chamber give access to the valve springs and also to the camshaft. The arrangement assures perfect lubrication of the valve springs, tappets and valve guides. There is a slightly increased tendency to take the exhaust from the front of the cylinder block, instead of at the rear, so as to avoid heating the driver's seat. The Dutch Spyker and the French Gregoire are two examples of this.

Aluminum Dashboard

Cast aluminum dashboards are becoming very common, not only on high-class but on the medium priced cars. Generally advantage is taken of these castings to get more convenient housing of vacuum tank and other accessories. The new Metallurgique has a recess in the center of the front face of the cast dash into which the



(1) The new 40-hp. F. N. four-cylinder 3½ x 5⅞ in. engine with integral exhaust and inlet manifolds. (2) Open clutch pit and gearset of 14 hp. of (5 x 6 in.) La Buire. Note neat layout of pedal and lever brake coupling. An aluminum instrument board is mounted on wooden dash. (3) Left-side 16-hp. (3⅜ x 5⅛ in.) Delahaye L head engine. Has three-point suspension, front extension of crankcase resting upon link attached to bracket of front cross member. Note left rear arm forms magneto bracket. Valves on right depart from usual European practice. (4) Isotta Fraschini 50-hp. eight-cylinder in line 3⅜ x 5⅛ in. engine has overhead valves, magneto ignition, dry disk clutch, three-speed gearset and sells in England at $9,500 for the chassis. (5) Vermorel rear springing. Front half of cantilever takes reaction from twin rear sections. Whole unit mounted on trunnion at center. Rear axle has aluminum two-part center with tapered steel extensions. (6) Rear end of Vermorel 12-hp. (3 x 5⅛ in.) unit powerplant, showing spherical jointed gearshift lever operating in four-speed gate, cast aluminum dash bracket and instrument board

circular section vacuum tank is fitted. The new Bignan Sport, not shown in the exhibition hall, has a ledge cast with the dash into which the vacuum tank and a reserve oil tank are mounted. Voisin mounts the vacuum tank through the cast dash. Spa has a wood dash faced with sheet aluminum on the engine side, and on it a door opening into a compartment containing ignition switches and terminals, which are thus out of sight but perfectly

accessible. Cast aluminum toe boards are frequently incorporated with cast dashboards, and polished aluminum instrument boards are much used and are held to the dashboards by either cast aluminum or forged steel brackets.

There are no radiator shutters on Continental cars, but not a few have gear or enclosed chain driven fans, with a clutch for throwing this out of engagement when desired. Examples of this are the Piccard-Pictet, which has chain drive for the combined fan and pumpshaft, with a clutch for the fan. Spyker drives the fan separately by enclosed chain, but has three speeds in addition to a clutch. Minerva has belt drive of the fan with a clutch. Spa is another example of positive driven fan with clutch.

Nearly all electric generators are positively driven on Continental chassis. Belt drive is not favored for this unit, although commonly seen on English machines; some of these latter drive both fan and generator from one belt—with not very much efficiency. Two units are in an immense majority for lighting and starting.

Tire pumps are becoming common on high grade chassis, but are rarely seen on cheap and medium priced productions. Piccard-Pictet fits the tire pump inside the gear box, with extension lead and engagement lever brought to the left-hand frame member and covered by an aluminum housing. Minerva has the tire pump driven off the engine. Farman places this unit inside the gearbox, similar to Piccard-Pictet. No accessory manufacturers make standardized tire pumps ready to be fitted to the chassis. Each maker has his own type, and cost is increased thereby.

Shock absorbers are being considered more and more as an essential part of the chassis, and are being correctly mounted by manufacturers. There are many good examples of axles and frames specially designed to receive a particular type of shock absorber. One of the best examples is the method of mounting Houdailles on the Farman chassis. Connection is made from frame to axle by a hardened ball, the stem of which is hollow and goes through the axle. Advantage is taken of this hollow stem to send grease through to the ball and socket connection of the shock absorber connecting rod. A similar arrangement is adopted for the rear. Minerva has a special boss forged on the front axle to receive the shock absorber ball head. Piccard-Pictet takes the ball headed shaft through the front axle. On the Turcat-Mery there is a distance piece between the two spring clips, the center portion of this piece being much thicker than the ends, and being bored to receive the short shaft with hardened ball head at its extremity, by which connection is made to the shock absorber.

A lot of good detail work has been done on brakes and brake control. There are no external brakes on Continental cars and very few with exposed shoes. With the adoption of unit construction of engine and gear box, the tendency is to drop the transmission brake and take all the braking effort through the rear wheels. Delage retains the transmission brake although braking on all four wheels, but this brake is really only intended to hold the car in a standing position. Die cast aluminum brake shoes are common, being used, among others, by Voisin, Farman, Panhard, Delage, Darracq, Hispano-Suiza; fabric and cast iron liners are about equally employed. On very high grade cars cast aluminum disks are used to enclose the brake drums, these being preferred to sheet steel by reason of their silence. Cables for brake operation have not made much progress. Voisin maintains them, but Fiat has dropped them for rods. Steel "tapes" for brake application find a limited application, being used by Panhard and by La Buire. Some very fine work has been done in brake connection layouts so as to secure easy adjustment with neatness and absence of rattle.

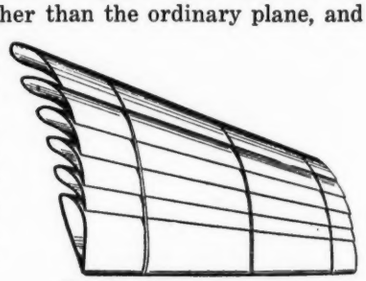
Continental manufacturers have not yet adopted the English practice of fitting leather or rubber gaiters to their springs, although there is no doubt these add to the comfort of the car. There is a slight break away from the rolled eye on the extremity of the spring. La Buire has the cantilever spring attached to the axle by means of a flange plate within which it is free to slide. This part is efficiently lubricated and is enclosed by a leather gaiter wired to the spring and held under the flange plate on the axle bracket. There is a break away from springs with a very large number of very thin leaves. Rolls-Royce in England and Darracq in France employ a few thick leaves, the main leaf running as high as 9/16 in. in thickness.

A New Aircraft Wing

FOR some months there have been frequent references in the British aircraft press to a new wing invented by Handley Page, the well-known aircraft designer. No detailed information regarding the form of the wing was issued until recently, owing to pendency of foreign patent applications, but on Oct. 21 a public demonstration was held, to which representatives of the press were invited.

In its fully developed form the Handley Page wing consists of a plurality of winglets combined into a single wing in Venetian blind fashion, as shown by the illustration herewith. The slots in the wing virtually convert a single wing into a number of wings and multiply the lifting power two or three times, it is claimed. This is said to be especially the case when the angle of incidence of the plane is steep. In the ordinary type of wing if the angle is increased a point is reached when lift is lost, and this is known as the "burble point." In the Handley Page wing the air flowing through the slots maintains the lift on the top surface of the plane, from which the greater part of the lift is derived even when plane meets the air at very steep angles, such as 45 deg.

The wings of the plane with which the demonstrations were made had only a single winglet, placed in front of the regular wing, with an air passage between the two. Mr. Handley Page said that the plane with the one slot had a lift 55 per cent higher than the ordinary plane, and that the DH-9 so fitted, and carrying a load of 3600 lb., got off in 70 yd., whereas the ordinary DH-9 took 170 yd. to get off with a load of 3100 lb. With the full "venetian blind" system the lift was increased 300 per cent.



The Handley Page wing

Keeping an Accurate Check on Gages

Quantity production demands accuracy in manufacture, and accuracy depends primarily on constantly true gages. The following article describes the way in which one automobile plant checks its gages against an accurate set of master gages. Systematic checking a matter of routine.

By J. Edward Schipper

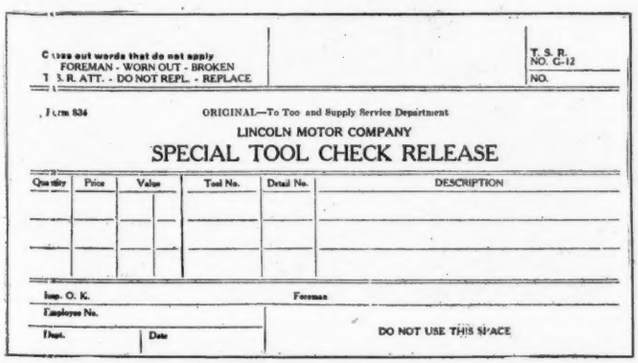
ACCURATE gages are a requisite for accurate manufacture. Close limits mean nothing if the gages against which they are checked are not themselves beyond question. It is impossible to maintain gages accurately without persistent, careful, systematic checking against a thoroughly reliable master set.

Quantity production calls for accuracy in manufacture, because as soon as a large number of a certain product is turned out, it becomes necessary to furnish service parts; and in order that these may exactly fit the parts produced originally, it is necessary that the dimensions be accurate. Furthermore, in quantity production it is desirable to eliminate the need for selection in the assembly processes. That is, people in the assembly room should be able to take units at random and put them together without trouble. This means accurate workmanship and exactness of measurement. In the case of very fine products, this accuracy of fit and measurement goes even beyond what is required for interchangeability and becomes a very definite factor in the life and performance of the product.

In the manufacture of its automobiles the Lincoln Motor Co. is making use of the same methods of maintaining accuracy as were employed in the manufacture of Liberty airplane engines for the Government. In the Lincoln car there are 5000 operations on which the tolerance is only 0.001 in.; on 1200 the tolerance is 0.0005 in., and on 300, 0.00025 in.

To maintain this high standard of accuracy, the tool inspection department carefully and systematically checks its gages as a matter of routine. This checking of the production gages is essential to obtaining the closeness of workmanship required by the drawings. The manner in which it is carried out makes an interesting story of precision in modern commercial production.

In setting tolerances for the manufacture of this product, no attempt was made to exceed practical requirements. The finer the tolerances are made, the more costly becomes the process of manufacture, and it would be unreasonable



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NO.

Form 834 ORIGINAL—To Tool and Supply Service Department

LINCOLN MOTOR COMPANY

SPECIAL TOOL CHECK RELEASE

Quantity	Price	Value	Tool No.	Detail No.	DESCRIPTION

Insp. O. K. Foreman

Employee No.

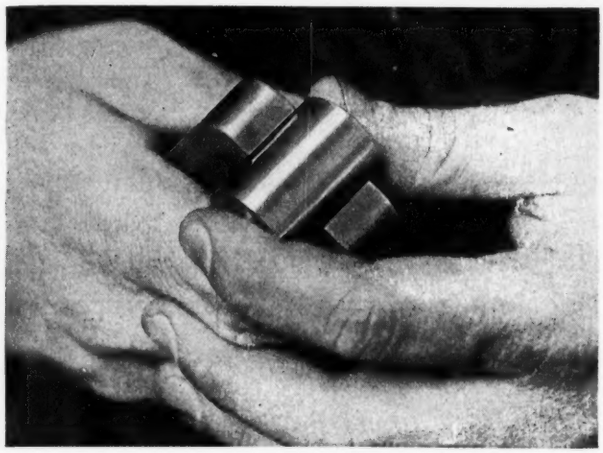
Dept. Date DO NOT USE THIS SPACE

Form of tool release used at the Lincoln Motor Co.

Testing a thread gage by the three-wire system on the Prestwich fluid gage. This check is verified by Johansson blocks, which are shown in the foreground of this illustration

to request the buyer to pay for more accuracy than sound manufacturing economics demands. But where accuracy returns a dividend, no effort is spared to narrow the tolerances. For instance, on some parts of the Lincoln motor, particularly the wrist pin, a deviation of 0.0003 in. is the limit.

It is the function of the tool inspection department to see to it that the inspections in the shop are correctly made. In the tool inspection room are a set of Johansson blocks to which everything is checked back. These blocks are the basic standards for the entire plant and do not leave this room. Field men inspect the gages in use in the various manufacturing departments. These field men, as a matter of routine, go from department to department, checking, by means of a field set of Johansson blocks, the gages in these departments. The routine work is so laid out that every department is visited at least once every two days. Some departments, in which the gages are put to service in which rapid wear may be expected, are visited every day. When a field man finds a gage which has become worn or distorted to a sufficient degree to require



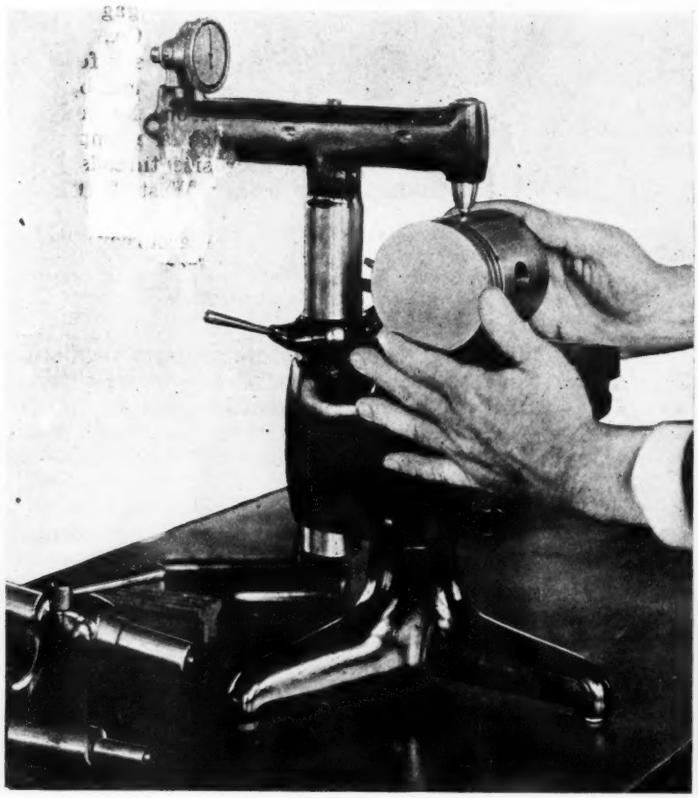
To the left—Inspector checking a piston pin with snap gage in production. To the right—Checking by means of a Johansson plug the snap gage used for inspecting piston pins

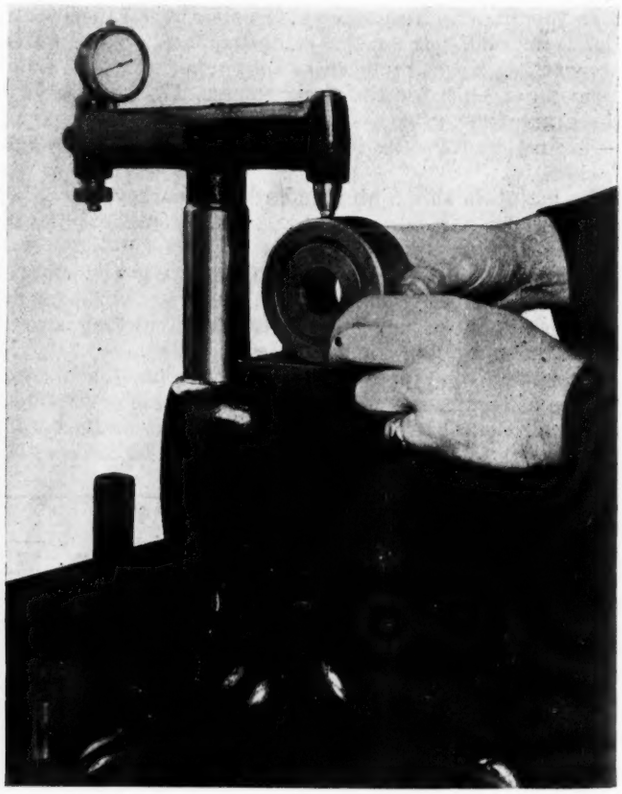
replacement, he withdraws the gage from production by means of a tool release form, and another one is issued immediately in its place.

In making the rounds, the field men go first to the tool cribs, to make certain that the gages in these cribs, which are issued against tool checks, are correct. Fixed gages not falling within the allowed limits for these gages—which, of course, are much closer than the limits for manufacture—are scrapped. Adjustable gages are brought to the tool inspection department for correction and resetting. After checking up the gages in the tool cribs, the gages in the manufacturing departments are checked in the same way, and when one is withdrawn for scrapping or adjustment, the replacement gage is issued from the tool crib. It is the duty of the crib man to have gages on hand to replace those which may be withdrawn by the tool inspection department field men.

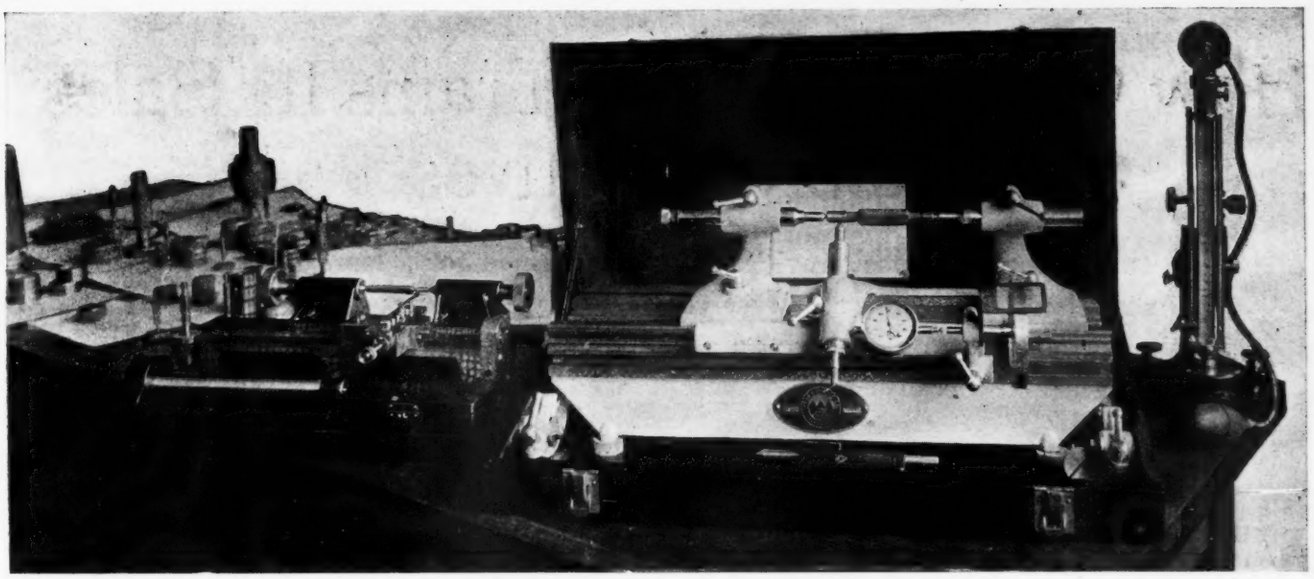
The gages are not reset by the field man's blocks, but are reset from the master blocks in the tool inspection department. The Johansson blocks in possession of the field men are used simply to check the gages on the job, and all resetting is done in the tool inspection department against the master blocks. The Johansson blocks used by the field men are checked monthly against the master blocks in the tool inspection room.

The work of resetting the various gages is carried on under the eye of the chief tool inspector and requires the highest degree of accuracy and the use of the most delicate and accurate measuring machinery. In measuring the thread gages, the three wire system of checking the





To the left—Checking a piston on the standard inspection gage used in production. To the right—Checking by means of a master plug gage the piston gage used in production. The master gage is checked back against Johansson blocks



Testing the pitch or lead of a thread gage on a West & Dodge instrument. The smaller instrument to the left is a Sheffield Machine Co.'s gage for the same purpose

pitch diameter is used. For pitch diameters above 1½ in., the Prestwich fluid gage is used, and for smaller diameters, the micrometer. A three wire test on the thread gage as carried out on the Prestwich gage is shown in the accompanying illustration. The three wire method, with which all tool men are familiar, consists of taking three wire-like plug gages, placing two in the Vs formed by adjacent threads at the bottom and one in a V at the top in the same vertical plane, and then taking a measurement over the wires by a micrometer or other instrument. These standard wires are of such diameter that they enter the V to the level of the pitch circle and thereby provide a means of measuring with micrometer or by the fluid gage, as described, the deviation from the nominal pitch diameter. This diameter is checked against Johansson blocks of the same measurement, so that even though a micrometer which is a trifle out of adjustment be used it would not cause any inaccuracy, because it is checked against the Johansson block.

In checking these thread gage diameters on the Prestwich fluid gage, the instrument is first set by the Johansson block. The thread gage is placed under the instrument, and the fluid column should then give the same indication on the ten-thousandths scale as when the block was under the instrument. The limits of variation allowed on the working thread gages are plus or minus 0.0003 in. up to 11/16 in., and plus or minus 0.0004 in. on working gages above 11/16. This applies to "go" gages. On no-go gages the limits of variation are 0.0001 in. less.

Go and no-go snap gages are checked directly against the Johansson blocks, as are all other gages with which this can be done. Special inspection gages or gage fixtures are checked back against the Johansson blocks. For instance, micrometers may be used, first on the Johansson block and then on the gage, or Johansson round plugs may be used.

A very interesting example of checking gages is afforded by the piston pin snap gage which is a go-and-no-go type by which the tolerances on the piston pin are held within 0.0003 in. Owing to the very small tolerances on this job, it is necessary to check these snap gages every day. Instead of a square Johansson block, a cylindrical Johansson plug is used for checking this gage, because it has been found that with a snap gage the continual rolling-in and rolling-out of the piston pin will eventually cause an irregularity or waviness in the gage surface, which would not be perceptible to the human eye and could not be detected by the Johansson block, which would touch only the high spots. When being rolled-in, a piston pin may conform to the irregularity in the surface of the snap gage, and while the square Johansson blocks would show the gage to be accurate, it is actually out and gives inaccurate results. By using the cylindrical Johansson plug, the conditions in testing the gage are similar to those in testing the piston pins, and it is consequently impossible for any inaccuracy to go undetected. The production check and the gaging check are illustrated herewith.

For checking the lead or pitch of screw [illegible]es, the lead gage made by the Sheffield Machine Tool [illegible] of Dayton, Ohio, is employed, using the Johansson bl[illegible]or setting. In other words, the machine is not the ga[illegible]ut simply the means for translating the check from t[illegible]read gage back to the Johansson blocks, w[illegible]re[illegible]loyed for checking the accuracy. On larger [illegible]s, a somewhat similar instrument made by [illegible] Dodge, of Boston, Mass., is employed.

Another method of checking the [illegible]acy of thread gages is to make a mold or casting from the threads and project it, enlarged fifty times, upon a screen A special instrument is used for projecting this, the c[illegible]sting being made with some core checking compound suc[illegible]s that made by the Arthur Knapp Engineering Corp. of New York City. This, of course, applies only to the internal threads which cannot be projected directly. An external thread can be projected without making a mold.

The machines and devices in the tool inspection departments are simply the means for checking the various gages against the Johansson blocks, and are not actual measuring instruments in themselves. In other words, these instruments, rather than giving a direct reading of the dimension involved, show only the difference between the master Johansson block and the gage tested. The readings are generally in ten thousandths of an inch.

By making the testing of manufacturing gages a routine process, with a definite schedule for the field men to cover, there is no chance for the production gages being out of true for any length of time. Since additional checks on the gages in the form of departmental checks are going on all the time, and all of the manufacturing gage operations are continually being referred back to the master gages, the Lincoln Motor Co. is assured that the limits set upon its drawings are being rigidly adhered to.

How One Large Firm Trains Its Sales Representatives

A twelve-weeks' course provides efficient salesmen for a large truck and tractor firm. Many of the ideas comprised in that course offer possibilities for adaptation elsewhere on a smaller scale. Special interest attaches to this article because of the present need for intensive salesmanship.

By Norman G. Shidle

WHATEVER the cause for a general business depression, the trouble in any particular case can usually be traced to the simple statement "Lack of sales." For this reason merchandising and selling effort is coming in for more intensive study than has been accorded it for a number of years. It is being recognized that many salesmen who might profitably be kept on the pay-roll as order takers during a period of business inflation must either be made into real business getters or become a liability to the organization.

In this situation many manufacturers are turning to methods of training salesmen so that their work may be improved, their efforts rendered more effective and the services be of greater ultimate value to the management. And in this process of training good salesmen the opportunity of training future organization executives is not being lost to view. Both these aims, at least, are comprised in the twelve weeks' training course for salesmen conducted by the International Harvester Co.

The course is designed to train men as general salesmen for the products of this company. Later they may become specialists for a particular line, but the aim of the training course is to make them capable of selling all of the various products—trucks, tractors, farm machinery, etc.—produced by the company.

The International selling organization is divided into five districts, each covering a definite part of the country. Each training course includes 25 men, five from each of the various districts. Great care is exercised in choosing the men who are to take the training, since the cost is large enough to necessitate a definite return on the investment made. The entire expense of the course, with the exception of salaries, is borne by the main organization.

Qualifications Necessary

Each branch manager is allowed to recommend to the district manager men to be sent from his branch. The men recommended, however, must have been employed at the branch at least three months before they are eligible for the training course. This is necessary that the man may have a general idea of how the branch organizations operate, what are the chief problems to be met with in the field, and have enough background to be able properly to absorb the material presented in the course. From the men recommended by the branch managers, the district manager selects the five men from his district who go into the training course.

Additional qualifications are that the man must be between the ages of 21 and 26 years, be in good health, of good character and habits, and of pleasing personal appearance and address. A high school education is required, but a good proportion of those taking the course have had a college education or its equivalent. It is desirable, though not essential, that the applicant have some practical knowledge of farm life and a college course in agriculture.

Objects of Course

The chief objects of the course may be listed as follows:

1. To strengthen the personnel of the sales department.
2. To raise the standard of salesmen.
3. To interest young men in the business to the extent that they will consider their connection with the company permanent.
4. To eliminate those who seek temporary employment while they look around for something they consider better.
5. To give the salesman sufficient preparation so that he will have a fair chance to make good.

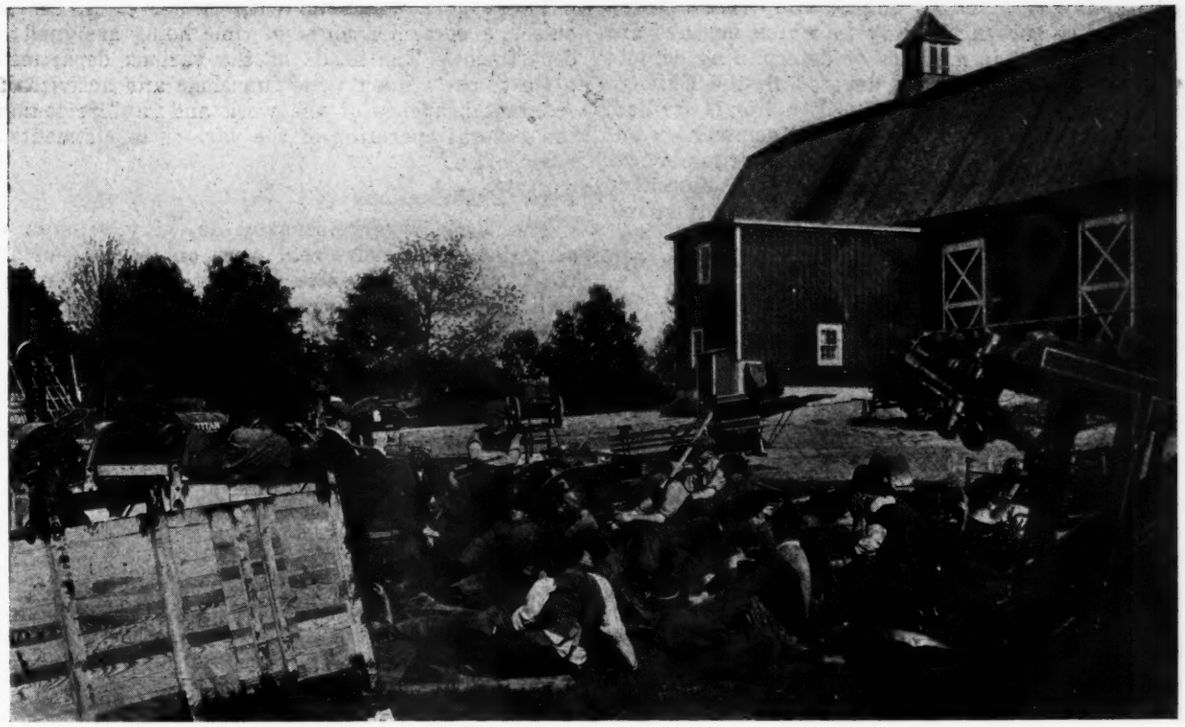
The machines studied during the course are included in the following list.

Tractors	Corn pickers
Trucks and Wagons	Corn binders
Engines	Corn shellers
Primrose cream separator	Feed mills
Grain binders	Ensilage cutters
Mowers	Tractor hitches
Reapers	Threshers
Rakes	Planters
Sweep rakes and stakers	Cultivators
Hay loaders	Spreaders
	Plows

As indicated in the outlined objects of the course, however, an attempt is made to give the men much more than merely a working knowledge of the various machines which they are to sell.

The first day of the course is spent in the general office sales department. After the necessary preliminaries of enrollment and introductions have been completed the entire class is addressed in short talks by several executives of the organization. These talks vary with each class, but include such subjects as "The Growing Demand for Leaders," "Thoroughness and Honesty in Business," "From Raw Material to Finished Product."

The next two days are occupied in giving the students a general introduction to agriculture. This is done under the auspices of the agricultural extension department. By means of a series of lectures, the importance of agriculture, many of its most important functions and operations, and the place of the organization's products in agriculture are presented.



Group of students hearing practical lecture during period spent on the farm

Beginning at this time the 25 men are divided into five groups, each of which contains the five men from a particular district. These five groups receive separate instruction on all practical work throughout the course. This enables each man to not only see very closely how everything is done, but also to have the opportunity of performing most of the operations himself.

Three days are spent in the study of wagons and wagon trucks. A general survey of the wagon plant under the direction of an instructor for each group is followed by a general lecture on the subject. Finally, the students themselves are required to tear down and set up the wagons.

Practically two weeks are spent on a farm. During this time the students are made thoroughly familiar with the uses and operation of the various pieces of farm machinery. They are required to become proficient in setting up and operating the machines; they learn the names of the various parts and understand how the machines are put together. The accompanying photograph shows a group of students under instruction.

A specified length of time is devoted to each machine. Tractors and plows, for instance, are studied for three days. In each case the instruction on a particular unit is under the direction of an expert on that particular implement or machine. Most of the expert technical men of the organization are utilized as instructors at some time during the course.

During the two weeks on the farm the students live in barracks. In this way they get together and become thoroughly acquainted with one another near the beginning of the course. An excellent opportunity is thus presented of making the group feel that it is really a unit; that every member of it is an integral part of the same organization; that they are all working for the same end.

The next week, following the actual farm experience, is spent in the West Pullman works of this company, where planters, cultivators, spreaders and other farm implements are manufactured. A specified length of time is spent in inspecting the manufacturing processes in each department of the plant, and each group is required to set up all the most important implements. The practical experience is interspersed with lectures pertaining to various angles of the work which is actually being done at the time.

During the following thirteen days binders, reapers, mowers, rakes, etc., are studied at the McCormick works, where these implements are manufactured. The work during this time is very similar to that of the preceding week just described, the only difference being in the machines studied and set up. Still other types of implements are studied during nine days at the Deering works.

The most important studies during the next ten days spent are the tractor and the internal combustion engine. The Titan tractor is studied at the Milwaukee works and the International in Chicago. Each day approximately seven hours are spent at the plant. From 3.30 to 4.30 each day a lecture is given on engines and tractors. The course in tractors and engines is particularly thorough, having in the process of development and operation for sometime previous to the installation of this entire training course.

Each of the five groups covers certain departments at certain times, so that it is possible for each group to thoroughly understand the entire plants and the various operations within the time limit set.

The originating and development departments are covered during the first day in Milwaukee. These departments include the pattern shops, foundry, forge shop, die sinking, sheet metal and stamping departments, pulley and steering device assembly, repair departments, heat-treating department, stores department, etc.

Among the departments covered on the second day are the following: New tools department, automatics, erecting International engines, parts assemblies for engines, etc. The third day covers chiefly assembly departments, while the finishing and shipping departments are studied on the fourth day.

An entire day is given to engine and tractor tests. The students are shown the way in which engines are tested and instructed in methods of determining defects and troubles. Three days are devoted to the Chicago tractor works where the International tractor is studied.

The course of lectures on the internal combustion engine and tractors which is given during this time begins with the simplest fundamentals and carries the student by means of explanations and charts through to the more difficult phases of engine design and operation. An outline of the chief subjects covered in these lectures will show in a general way the ground that is covered:

1. Development of Internal-Combustion Engines.
2. Basic Features of Internal-Combustion Engine Design.
3. What Is Going On Within the Engine Cylinder.
4. Classification of Engine Parts by Functions.
5. What Each System Must Accomplish.
6. Liquid Fuels for Internal-Combustion Engines.
7. Getting the Most Power Out of Fuel.
8. Lubricating Oils and Compounds.
9. Tractor Requirements.
10. Plowing Speeds.
11. Materials Used in Engines and Tractors.
12. Processes in the Handling of Metals.
13. Overloading a Tractor Is Poor Practice.
14. Cold Weather Hints.
15. Storing and Overhauling the Tractor.
16. Engine Troubles Classified.
17. Miscellaneous Tractor Information.
18. Plow Adjustments, Care and Operation.

Truck Study Thorough

The final week of practical work is spent in the motor truck factory at Akron. The work here is begun with a short talk describing the truck plant, its functions and the relationship of sales to manufacturing effort. The same practical type of instruction and experience is given in connection with motor trucks as with tractors. The work at this plant is taken up in the following order:

1. Laboratory Tests.
   Including fatigue tests, axle test, front wheel spindles, and spring test.
2. General Survey of Machine Shops.
3. Magneto.
   Including construction, adjustments, wear, trouble location, makes used.
4. Carbureter.
   Including types, carburetion, construction, adjustments, and effects of weather and altitude.
5. Engine Assembly and Test.
   Including various stages of assembly units, fitting of bearings, tolerance, timing of motor, motor test under actual load.
6. Transmission Assembly.
   Including assembling of units for transmission tests, functions and misuses.
7. Differential Assembly.
   Including demonstration of differential workings, tests to secure proper alignment and adjustments, making adjustment, and instruction of how to remove component parts.
8. Steering Gear.
   Including particular design used on International truck, strength, ease of operation, and adjustment.
9. Final Assembly.
   Including rear axle, springs, steering gear, motor, transmission, clutch adjustment, paint and trim.
10. Final Test and Inspection.

The students are also made thoroughly familiar with the work of the repairs department, the procedure as to returned goods, the activities and function of the service station, the work of the road engineers and repair men.

Before returning for two days in the general offices, a brief inspection trip is made to a steel factory, where the students become familiar in a general way with the manufacture of steel.

The course winds up with two days in the general offices, a certain amount of time being assigned to each department. The heads of the various departments explain to the students the functions and activities of the different branches of the work and familiarize them with the general operation of the various departments of the home office.

Rigid Examinations

The work is very intensive at every point of the instruction. To insure real work on the part of the students, an examination is given at the end of each week. This examination covers in each case the work covered during the previous week. In this way the student is practically compelled to pay close attention to the work at hand, make intelligent notes and understand thoroughly all the instruction that has been presented. The examinations sometimes take as long as five hours to complete, although the average is about two hours. To illustrate the type of examination, a few selected questions are given from the fifty asked after the week in the truck factory:

1. Name five (5) principal conditions upon which depend the proper functioning of a motor.
2. Name five (5) reasons why motor overheats.
3. Name five (5) reasons for loss of power.
4. In fitting new pistons how much clearance should piston have in cylinder?
5. How much clearance should new piston rings have?
6. What is the relation of the speed of the magneto to the speed of the crankshaft in a four-cylinder, four-cycle motor?
7. What method should be employed to determine whether or not high-tension magneto is performing its function when motor fails to start?
8. How many adjustments are there to the differential? Name them.
9. What type of final drive is used on all models of International motor trucks?
10. Name at least five (5) advantages to be derived from use of this type of axle over the worm-driven type.
11. How many dollars' worth of repair parts should be sold to the dealer in connection with his contract?
12. What one branch or phase of our work is of the most vital importance to future of the motor truck business?
13. Name the advantages that the branch house record card, form C-2423, is to the truck owner and company.
14. What is your conception of the duties of a road engineer and what benefits will be derived from his work?
15. Why will our service policy appeal strongly to both truck owners and dealers or distributors?
16. What benefits are to be derived by the manufacturing, engineering departments and by you personally in the field from the proper functioning of service policy as outlined in Bulletin No. 12?

The course has been in operation long enough to be judged entirely successful, although slight changes and improvements are still being made as experience dictates. It has been found of very great benefit to the morale of the organization, both in providing enthusiastic field representatives and in increasing the co-operative spirit between the various branches and units of the company.

A NUMBER of American-built motorcycles were in evidence at the recent Olympia motorcycle show in England. Among the American machines on exhibition were the following: Harley-Davidson, Indian, Reading-Standard, Henderson. The workmanship of the American machines received favorable comment in several British journals. Motorcycle, for instance, says of the Reading-Standard: "It is more up-to-date than many of the British machines in that mechanical lubrication is fitted."

Secretary Meredith's Highway Program

In the annual report of the Secretary of Agriculture is set forth the need of a continuation of action on the Federal Highway program. This need is based on the necessity of adequate transportation.

IMMEDIATE consideration should be given by Congress to plans for extending the Federal-aid road-building program, the period for which by the original act, as amended, terminates with the close of the present fiscal year, declared the Secretary of Agriculture in his annual report to the President. In order that there may be no halting in the work it is hoped, he said, that the Congress will, at its next session, provide additional funds, to be expended under the terms of existing legislation with certain modifications, at the rate of $100,000,000 a year for a period of five years, beginning with July 1, 1921.

Future legislation, the Secretary said, should not disturb the principles embodied in the act of 1916.

"The principal modifications in mind relate to the problem confronting the Western States in highway work because of the existence in many of them of large areas of public lands, and to the maintenance of Federal-aid roads by the State highway agencies rather than by the counties. The Association of State Highway Officials, at its meeting in December, 1919, unanimously approved the continuance of the present plan of Federal participation.

Need for Prompt Action

"The fact that the present appropriation may not be entirely expended by June 30, 1921, does not lessen the necessity of immediate action. Both the Federal and State highway departments should know, as promptly as possible, the program for the next five years, in order that the work may be adequately planned and the engineering and administrative details carefully executed. Forty of the State legislatures will be in session this winter, when it will be necessary for them to make the requisite provision for meeting future Federal apportionments. From every standpoint, therefore, it is essential that legislation for the continuance of the program now under way be promptly enacted.

"Provision should be made also for the continued building, on an adequate scale, of roads within or adjacent to the national forests. The forest road systems are very closely related to those of the States, and the major forest projects form important links in essential State and interstate highways. There are approximately 15,000 miles of roads within the forests which connect with State and county highway systems. The building of forest roads, therefore, is an important part of the general road development plan of the West, both within and without the forest areas. In addition, the transportation of forest products, the protection and administration of the forests themselves, and their utilization for recreational purposes are all dependent upon the construction and maintenance of serviceable roads."

Good Progress Made

In view of the abnormal conditions which have prevailed since 1916, the report stated the progress that has been made in placing a large highway improvement program under way is surprisingly good. In the three years, 1917, 1918 and 1919, there were approved 677 projects, calling for the construction of 5790 miles of road and involving a total cost of $56,418,673, of which the Federal share was $23,931,618. During the fiscal year 1920, 1670 projects submitted by the States, involving the improvement of 16,670 miles and a total allotment of $109,830,366 of Federal funds, were approved. At the end of the year 14,940 miles of Federal-aid roads, on which $103,925,094 of Federal funds had been allotted, were under consideration and in various stages of completion, while 1677 miles had been entirely completed. Preliminary engineering investigations have been made on 4003 miles of forest roads and construction has been completed, or is in progress, on 1300 miles.

The work of actual construction has suffered from several causes, which varied in intensity in the different States. They include:

(1) The difficulty of securing transportation facilities for road materials.

(2) The lack of materials, particularly cement, steel, and culvert pipe.

(3) The lack of available contractors and labor.

(4) Difficulties experienced in disposing of road bonds.

In order to provide for the full correlation of the work of the department and of the State highway agencies, the advisory board has been enlarged to include all the members of the executive committee and the officers of the Association of State Highway Officials.

Transportation an Acute Need

"It required a great national catastrophe to awaken the American public to the inadequacy of our transportation facilities and to the fact that we must depend largely upon our highways, in conjunction with motor vehicles, when a sudden expansion in transportation is essential," said the Secretary. "Our experiences during the last three years have clearly demonstrated that the failure earlier to inaugurate a sound road-improvement program has retarded the effective development of one of our most vital national requirements. The use of the motor vehicle for highway transportation has increased tremendously within a short period. In 1906 only 48,000 motor vehicles were registered in the United States. By 1914 the number had risen to 1,700,000, while the registrations now total nearly 8,000,000, exclusive of motorcycles. The actual vehicle-mile use of our roads, it is estimated, has increased more than 500 per cent in strictly agricultural communities and more than 1000 per cent near the larger centers of population. These figures indicate the extent to which community and short-haul transportation will be served by better highways."

The Federal-aid road act of 1916, as amended, has resulted in putting in motion a great program of highway development, nation-wide in its extent. The original act appropriated $75,000,000, extending over a five-year period, for the construction of rural post roads in cooperation with the States.

Systems Likely to Overshadow the Individual in Labor Discussions

Suppose that you substituted the name of an employee of your factory for the word "labor" in all of your conversations and discussions regarding industrial relations; how long would it be before you ceased to have an abstract problem and reached an understanding with the individuals?

By Harry Tipper

THERE are two phases in the discussion of the labor problem which threaten to overshadow the problem itself, so that the actual factors which enter into the problem are absorbed thereby. **It seems impossible for us to hang on to the idea that human difficulties and grievances arise out of the individual attitude in the first place, and that it is only when the individual attitude is changed that the mass problem disappears.**

Perhaps this approach to the problem is too simple for us. It does not suggest enough formality, it does not lend itself to charts, and organizations, and boards, it has little or nothing to do with judges and adjustments, and it is not particularly concerned with committees and trade associations. Perhaps it is only that we do not take the full responsibility for every act as an individual, and we don't wish to emphasize the individual responsibility and character of all difficulty in its inception.

It is so much more convenient to talk about labor than it is to talk about John Smith. We may know John Smith, and anyway he is a particular individual, and we would not care to do him an injustice, but we can say anything about labor because that does not mean a person, it applies to an indefinite mass which in our subconscious reactions has no human individual qualities.

Similarly, we do not care to speak about Robinson, who may be our boss, because we would have to respect his personality even while we disagreed with him, but we can talk about capital and capitalists, and rant all we want to about the system and the men without having any fear of being called to account.

> **Whatever it may be, we particularly delight in talking about systems of solving difficulties which are individual and human, but we talk little about the individual human necessities. It is not without interest that while there are thousands of books upon Socialism, trade unionism, capitalism and a whole host of industrialisms, the history of literature shows only four books on conscience in the whole literature of which we have any record.**

This is called to mind by the fact that Colliers is backing Hoover's system of regional boards suggested in the Second Industrial Conference, and it is getting the opinions of all sorts and conditions of men as to the value of this system. Most of the correspondence published in this respect either endorses or rejects the system with very little attention to the human requirements in the case, and with very little getting down to the brass tacks of the matter—the attitude of the individual worker.

It is refreshing to note a letter from a man in the automotive field which is worth reading for the constructive character of its suggestions, whatever may be said of the system which is the subject matter of the communication. This letter was written by Alvan MacCauley, president of the Packard Motor Car Co., and we are quoting it at length because of the constructive suggestion it contains:

The proposal in your editorial to "make the settlement before the strike begins" is obviously common sense, and the machinery suggested to insure opportunity for such settlement seems a necessary measure to offset the prejudices and rancors which hinder discussion when controversies reach the strike stage. But it is unfortunate that such rancors should be aroused and, perhaps more often than not, it is unnecessary.

> **An even better solution of the labor problem, in that it removes the causes of controversies and rancors alike, and a solution very largely in the power of employers, is shown by Mr. Whitney Williams's articles.**
>
> **These call attention to the fundamental importance of fair and human treatment of the individuals who are the units of the labor problem.**
>
> **Perhaps the lesson which should be drawn from these articles can be emphasized by the statement of a few of the facts concerning the successful relations which have followed this company's attempts to correct the very conditions which Mr. Williams reports as being galling to workers.**

Men will be content and will do good work if they are given fair pay, opportunity for advancement, decent surroundings, treatment which promotes their self-respect, assurance of stability of employment, and work in which they can take pride.

We have felt that all these things were not only possible, but were obligatory upon us as employers. We have attempted no paternalism, have no elaborate system of shop representation, no profit sharing, and we have not found it necessary to resort to collective bargaining.

Our chief difficulties with the policy outlined have been to make sure that it was being carried out through a large force and by hundreds of minor executives. To insure this we have held schools for our shop executives, teaching them a proper attitude toward the men under them, and driving home the fact that their first duty is toward these men even more than toward their superiors. We impress on the foremen that they must look for success and advancement to their men, and that the first point that will be considered in measuring their success is their relations with the men and the amount of their labor turnover.

We have established several rules for the government of our shops which meet points that Mr. Williams found important.

First—We permit no injury to a man's self-respect. We allow no cursing of the men, no "bawling out," not even a reprimand in public. We permit no one below the grade of foreman to administer any kind of a rebuke. We insist that the foreman himself shall receive each new man, put him to work, and see that he is familiar with his duties and his tools. We do not fill the factory with irksome rules. In general, we use the honor system in all our dealings with our men.

Second—We make sure that every man has, and knows that he has, full opportunity for advancement. We try to give wage increases before they are asked for, whenever they are earned. A man is assigned work in accordance with his preference wherever possible.

As men gain in skill they are promoted to more complicated work, instead of being held back because of the very ability they may have developed on the simpler operation.

Third—We do not drive the men. We give them ample time to do work of the kind in which they can take pride. Time study and efficiency methods are used, but in them allowance is made for the superior quality of work we demand, and no man is ever forced, by the standard of production, to turn out poor work in order to make a fair wage. We pay for much of our work on the bonus system, permitting full recognition of individual skill and steadiness, or, in the case of gang work, of the skill of the gang as a whole.

But the standard time on all jobs is so fixed as to permit moderately good men to earn a fair living, without overstrain, while it allows the better workmen to profit considerably.

Fourth—We try to see that each man earns a good wage. If we find that a workman is unable to earn a premium above his hourly rate, after he has become familiar with the job, an investigation is made to see whether he cannot be helped.

Finally, we assure the men against the danger of an increase in the amount of work demanded of them to make their wage by a pledge, rigidly enforced, that after the standard time on a job has been fixed it shall not be changed except to the man's advantage, unless tools or other conditions are changed.

The men recognize this policy and their turnout reflects their individual ability.

Fifth—We do not patronize our men. We have a welfare department which gives them what aid they want in organizing sports or other activities, but the initiative for these things comes from the men themselves. If they ask legal advice or medical attention, we are glad to give it, but we assume no right to supervise or control any activity outside the workshops. We do assume in full the duty of seeing that the shops are clean, well-lighted, well-ventilated, and safe.

In brief, our men are Americans, demanding fair play as a right; self-respecting, intelligent, and honorable. We treat them on this basis. We believe that their contentment, steadiness, and efficiency are the inevitable result of this treatment.

It is impossible to give too much emphasis to the statement that regional boards, national organizations and Whitley Councils will be of no avail in settling the labor problems, unless and until the desires of the individual worker are understood. The basis of every improvement must be a greater understanding of what is involved in the just and human treatment of the employee, not only in the general way, but in every detail of the operation in the industrial establishment.

The machinery of adjustment which is working in Great Britain represents almost every type which could be conceived of, for permitting full discussion and accumulating all the former methods of agreement.

All these organizations, however, have not eliminated the strike in Great Britain and it is apparent to the observer that their multiplication has confused instead of clarified the matter, while their universal adoption and their relative strength has not assuaged in the least the imperious nature of their demands.

We have maintained in these pages at all times, that the system was unimportant except as it gave expression to the spirit of understanding and the desire for fair play. Systems are necessary in order to provide such means of expression, but we are apt to lean upon them, to complicate them by the introduction of fresh details when they fail and to attempt the impossible tasks of substituting them for understanding between individuals.

It is not necessary that we should have extensive national systems of industrial conciliation in this country, unless we lack the intelligence in respect of the problem to such a degree that we are unable to secure a fair measure of square dealing between employer and employee in the individual establishment without the pressure of outside opinion.

It is not necessary that we should be obliged to submit the disputes which must arise between small groups of men to the slow, cumbersome and formal processes of such an elaborate method of settlement, if we are ready to take advantage of the present conditions and work in the individual establishment with a decent measure of co-operation.

That agreement which can be brought about by the growth of understanding between men who work on the same job with the same common purpose in production or distribution, is a greater influence for industrial peace than all the formal systems which have been invented so far. It is neither impossible nor extremely difficult to secure this measure of understanding. It requires only a desire for square dealing and human treatment expressed through actions within the factory to bring it about, and the examples which can be found in every industry are sufficient evidence of its possibility.

A little study of the human desires and necessities and a sincere attempt to provide the proper working conditions from this standpoint will give sufficient improvement to establish a large measure of industrial peace. Without that, no particular system has proved its capacity to be of any service.

SEVERAL months ago a company, subsidiary to the Standard Oil Company and called the "Economique," was formed with a capital of ten million francs. Its headquarters are in Paris, 82, Avenue des Champs Elysees, and its principal activity is to be the distribution of petroleum and gasoline. The company has bought a site of considerable area at Saint Ouen, outside Paris, on which it is proposed to build reservoirs capable of holding several thousand tons of gasoline, kerosene and fuel oil. Pipe lines are to be laid from the quays along the Seine to the reservoirs. The necessary formalities for the construction of this huge oil depot have already been begun, and as soon as they are completed construction will commence.

AUTOMOTIVE INDUSTRIES
The Automobile

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Better Crating

BOXING and crating has been and likely will continue to be a serious question with all exporters, especially automotive exporters. It is generally admitted that the laxity in crating results from ignorance of the conditions that the package will encounter rather than a deliberate intent on the part of the packer to wreck his merchandise en route. During the war the munition and other shippers are reported to have accomplished a very good job in the packing. This was done by specifications provided by the Government for the particular job. The specifications were supplied as a result of investigations by the Forest Products Laboratory. Now the laboratory is quite willing to provide a similar service for any packer who may be willing to come to Madison and study the situation. This is arranged in the way of special classes consisting of 12 men each. An intensive six-day course is provided. Classes will be organized on Jan. 10, March 7 and May 2, 1921. A co-operative fee of $100 is required, in addition to each student paying his personal expenses. The fee goes toward the support of the excellent work the laboratory is doing. Applications should be made by the firm that is sending the student, as this is not a plan to equip a man to get a job, but a plan to accomplish a definite service to trade generally.

Incomes and Motor Cars

THE automobile is receiving entirely too much attention from partially informed economists. Automobile economics appears to be comparable to the newspaper business—everybody thinks they know all about it.

This remark is prompted by an article in a recent number of *The Annalist*, a publication deserving of much respect. This particular article looks harmless enough under the title, "One Answer to the Tax Problem Which Might Solve It." Our objection is this—the writer assumed, perhaps unconsciously, that no person with an income below the taxable limit should or can own a motor car. Perhaps he never lived in a small town or has forgotten that a great many persons in more or less rural communities can do what appears to be impossible to the city resident. Has he considered that practically one-half of the automobiles in use to-day are Fords; that many of these were purchased by the savings of years; that many thrifty persons earning comparatively low wages live in small communities where they have their own gardens and space for a garage; that the saving realized on the products of gardens are not within the tax sheet finances, although they in effect materially increase income; that where a person owns his garage and uses a car economically the expense is extremely small; that the ownership of an automobile and its use by a farmer is a part of his exemption? But why continue?

This writer, like so many others, still considers the automobile a luxury. That word applies to a very small percentage of motor vehicles, so small a proportion as to be a negligible factor.

We are in entire agreement with the belief that many persons escape income taxes, but we do not believe that an investigation of the incomes of motor car owners will reveal the tax evaders. We believe that the first step is to simplify the tax return. If ownership of any special article is to be made a test, why not select something that is akin to a luxury, not in any sense a prime necessity. Would it not be better, for instance, to check up on important jewelry purchases, or to require from each taxpayer an exact statement of his expenses for amusements?

Motor Vehicle Safety Aids

A RATHER striking and far-reaching campaign against motor vehicle accidents has been undertaken by the National Safety Council, which has branches in 40 cities of the country. The campaign is based upon the distribution of a series of lessons on safe motor vehicle driving. These lessons are to be placed in the hands of the vehicle owner and driver. The lessons have been prepared by a group

of men who have given their best thought to the problem, and they have considered the rights of the vehicle, the driver and of the pedestrian. The present idea is to obtain the largest possible efficient distribution of these leaflets, and for that reason they are being offered to all branches of the automotive industry for distribution.

This appears to be a step in the right direction—that of lessening the destruction of human life and property. The National Safety Council can be addressed either through a local agency or at 168 Michigan Avenue, Chicago.

The French Economy Contest

CONSIDERABLE interest has been aroused by the rather remarkable results achieved in the recent economy contest at Le Mans, as reported in AUTOMOTIVE INDUSTRIES of Nov. 25. The record established by the winner is so much ahead of the usual commercial performances that some people have found it hard to believe the accuracy of the results. But the supervision in the contest was so strict that there seems to have been no possibility of fraud, and, of course, there is no scientific reason why the feat should not be possible.

Two things must be kept in mind in judging the performance. It was not a contest limited to stock cars, and the fuel used by most of the contestants was benzol. Benzol contains more heat units per gallon than gasoline, and, besides, permits of the use of a higher compression, being less given to knocking and pinking. A higher compression is usually accompanied by a higher thermal efficiency, and this, together with the higher heat content should make for quite a reduction in fuel consumption as compared with the use of gasoline. It is therefore impossible to make a direct comparison with consumption records established with gasoline. The claim of a world's record also is not warranted, as there is no world organization looking after economy records.

It is not unlikely that in order to show the best possible economy, some of the cars had their compression volumes reduced to a point where they could not have been successfully operated under full throttle. This gives conditions very favorable to economy at half load or so, which is probably all the power that was required in the test, for not only is the advantage of the high compression gained, but the burning charge is also expanded more than in an engine as normally arranged.

In connection with the question of the most economical running speed, recently discussed in these columns, it is noteworthy that the average speed of the first ten in the French test was about 24 m.p.h.

Economic Research as an Aid to Sound Business

IS the gathering, analysis and application of economic statistics being given the consideration it deserves in the automotive industry? We fear not, else the precious financial situation which to-day confronts many companies in the industry would not have arisen.

The function of statistics was admirably set forth recently in an address by Dr. Joseph E. Pogue before the American Petroleum Institute. It was pointed out that "economic research is growing in importance as a method for investigating operating and economic conditions for purposes of contributing to productivity and accuracy of planning." Such research should be employed far more extensively in the automotive as well as in the oil and other industries than is the case to-day. If it fails to be so used how else is the business executive to be intelligently guided in building for the future? Can he afford to be guided only by gossip in the trade, or by mere "hunches"?

This is the old fashioned method. It can and must be improved. The modern and rational procedure is to apply engineering methods first in securing, then in analyzing available data and finally in applying the deductions made. It is simply applying scientific management to the business end of manufacturing.

Economic research, adequately applied has reduced the insurance business virtually to an exact science. No progressive banking or investment establishment of size and repute is without its statistical and research bureau. Up-to-date advertisers make close and extensive use of research methods in appraising markets. Similar methods must see wider application in the automotive field. They need to be applied to purchasing and production as well as to selling, and should be considered on a broad economic basis, in their relation to other business such as the fuel and steel industries.

Routine or statistical research work can often be carried on advantageously through central bureaus serving an entire industry, but the results require expert analysis and application to individual cases to be most useful. Every manufacturer should consider the matter thoroughly and make certain that his organization is profiting by modern methods in economic research. This is one way in which to build soundly and avoid, at least to some extent, the effects of business depression.

A Christmas Suggestion

IS the "Holiday gift impulse warming your heart toward loved ones and friends"? If so, give 'em an iceless icechest. This thought is suggested in a letter we recently received from the retail sales manager of a concern manufacturing this particular variety of heart-warmers. It's so good we are passing it on to our readers. We are uncertain whether or not the idea originated in Dayton. However, the need for machines of the character noted was evidenced as we understand it, when certain prominent engineers from that region gave vent to their feelings during the development of a cooling machine. An engineer who overheats is much the same as a car that does the same thing. Anyhow, something's apt to be said in either case. Be this as it may, it's a good thing that coolers and warmers are both made in the automotive industry. It provides a larger variety from which to select holiday gifts.

Industry Thinks Upward Trend Near

Greater Confidence Shown on All Sides

Improvement Will Not Be Rapid, However—Potential Purchasing Power Curtailed

(By James C. Dalton)

NEW YORK, Dec. 13—Greater confidence in the future has become apparent in the automotive industry in the past fortnight. This more hopeful feeling pervades all branches of the business, from the parts and accessory makers to the manufacturers of complete vehicles, distributers and dealers. There are signs of renewed life all along the line.

Parts manufacturers are receiving some substantial orders for deliveries covering a considerable period, passenger car manufacturers already have increased their daily schedules slightly or are preparing to do so in the near future, increased interest is being shown in trucks and there has been some stimulation of sales at retail in most sections of the country. The Goodyear Tire & Rubber Co. has called back 9000 former employees preparatory to doubling its present production Jan. 1.

Predictions of better business in the near future with an upward turn in January are based largely upon the belief that the show season, with the attendant advertising campaigns which will cover the entire country, will stimulate interest in automobiles and bring a substantial crop of orders.

Production Peak to Take Time

These expectations undoubtedly will be realized and conditions throughout the industry probably will improve with the beginning of 1921. The improvement will not be rapid, however, and it will be some time before factories are back at the peak of production reached early this year.

Hope that the automobile business will reach a normal basis any more quickly than other industries is idle. As AUTOMOTIVE INDUSTRIES has pointed out repeatedly, the return to normal is dependent solely upon the restoration of a general price level at which the public will buy. This does not mean advocacy of lower prices for motor cars. It means that when the average family budget gets down to what the average man considers fair proportions he will begin thinking about a new motor car. He will not be so much concerned about the price of the car as he will about the price of beefsteak, shoes and a spring suit.

Any one who pretends to predict when that time will come is merely guessing. It will be brought immeasurably nearer when the retailers of household commodities pass on to the consumers the reductions which already have been made in the wholesale prices of commodities. Regardless of the justice of his contention that he cannot afford to sell at their replacement value the goods he bought at peak prices, it is unquestionably the retailer who is retarding the process of readjustment. The retailer is clinging desperately to the hope that he can unload his high-cost goods during the holiday rush. The break in retail prices probably will come, therefore, soon after Jan. 1.

Condition Not Extraordinary

There is nothing especially extraordinary about the present industrial depression. The conditions which now prevail always have been associated with the collapse at the end of a period of over-expansion and great prosperity. The most remarkable circumstance is that there has been no panic in the generally accepted meaning of the word. Devout thanks for this blessing should be given to the Federal Reserve system. The banks within this system are safe and there will be no bank failures except small institutions in the agricultural districts. Discussing this subject in its December bulletin, the National City Bank says:

"This slump in business conditions has demonstrated again that the great movements which make good times or bad times are spontaneous and beyond control. They are due to mass action and mass psychology. The business of the country depends upon the purchases and policies of tens of millions of individuals and when they become generally possessed of a spirit of confidence and go ahead with their planning and spending under its influence, we have a period of prosperity."

March Probable Turning Point

Bankers and students of economics generally, in forecasts of the future, fix upon March as the real turning point. They point out that credit conditions will be markedly easier after the first of the year and that this will bring a feeling of greater confidence which will lead gradually to a resumption of business in all lines. As has been said before, however, this will depend upon the establishment of a normal and more or less stable price level.

In thinking of the future and the better business which it undoubtedly will bring, the manufacturer and dealer should not forget that there has been a marked shrinkage in the potential purchasing power of the country. The depreciation in crop value has meant a curtailment of between $6,000,000,000 and $8,000,000,000 in the purchasing power of the agricultural population. Makers and sellers of goods cannot go on as

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UPWARD REVISION OF PRODUCTION SCHEDULES MARKS BEGINNING OF NEW BUSINESS ERA

THERE is no lack of concrete evidence that the turn of the tide is near in the automotive industry. Passenger car, truck and parts manufacturers are convinced better business will come with the turn of the year and are making their plans accordingly. Here are a few facts to prove the better feeling:

The Goodyear Tire & Rubber Co. has directed 9000 laid off employees to be ready for duty Jan. 3 and present production will be doubled. The B. F. Goodrich Co. has sent notices to all former employees to report either in person or by mail early in January. The Firestone and Miller companies are keeping in close touch with laid off workers.

The Hupp Motor Car Co. has started a production schedule of 35 a day, six days a week, an increase of 10 a day. The production was 10 a day in October.

The Oakland Motor Car Co. has begun making 75 engines daily and this will be increased, it is asserted, until a daily schedule of 100 automobiles and 150 engines a day is reached next month.

The Ford plant will close for inventory only from Dec. 24 to Jan. 3 instead of closing Dec. 15 as planned.

The General Motors Truck plant at Pontiac has resumed operations after being down a month. About half the workmen have been re-employed on a production schedule calling for 400 vehicles the rest of this month.

The Gale Mfg. Co., Albion, Mich., which supplies castings to many automotive plants, has resumed work after being down for two months.

Operations were resumed Monday in the body factory of the Milburn Wagon Co., Toledo, after being closed since the middle of October. The plant started on an order from General Motors Corporation for automobile bodies representing several million dollars. These are to go to the Oldsmobile plant at Lansing and are for coupe and sedan cars.

Effort to Buy Dodge Plant Likely

New York Interests Long Have Sought It

Death of Both Brothers May Make Efforts Successful, Detroit Bankers Feel

DETROIT, Dec. 12—The death of Horace E. Dodge, in the opinion of Detroit bankers, is certain to result in renewed efforts of New York financial interests to obtain control of the Dodge Bros. Motor Car Co., and with the company passing into the exclusive control of his widow and the widow of John Dodge, it is regarded as highly probable such efforts will be successful.

For the time being, however, the death of Horace will in no way interfere with the conduct of the plant nor the administration of affairs. Horace Dodge has been in bad health since the death of his brother and has given little attention to the details of the business, practically turning over control to F. J. Haynes, vice-president and general manager, and close friend and associate of the Dodge brothers. While it is known Haynes has been in poor health for some time his condition is said not to be such as to compel him to relinquish active management.

It has been reported for some months that the company had felt keenly the loss of A. B. Baker who, during the illness of General Sales Manager Philp, was actual director of sales and merchandising. This, coupled with reports that Dodge Bros. were borrowing $10,000,000, caused many rumors which were aggravated by the recent announcement of curtailment of production and closing of most of the plant.

President Emory W. Clark of the First and Old Detroit National Bank, and Vice-President C. A. Talbot of the National Bank of Commerce said to-day, however, there was not the slightest concern as to Dodge Bros., and, as a matter of fact, the company was not even being considered in banking calculations. Clark admitted the company had made arrangements for a loan of $10,000,000, but declared it had never availed itself of the loan or any part of it, finding it unnecessary. Both bankers declared the company in splendid financial condition and not indebted to Detroit banks.

Reports current that the plant might be removed from Detroit were scorned and the financiers declared the suggestion absurd. It was admitted by Clark, however, that the death of Horace in all probability would result in renewed efforts of Eastern capitalists to get control and that success of such negotia-

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The late Horace E. Dodge

Death of Horace Dodge Shock to Friends; History of Career Reads Like Romance

DETROIT, Dec. 12—The unexpected death of Horace E. Dodge at Palm Beach Friday was a shock even to his close friends. He had been ill for months, but they believed his health was improving and were hopeful that another winter at Palm Beach, where he purchased a winter home, would greatly benefit him. He passed away soon after his arrival in the South, however.

The body of Mr. Dodge arrived in Detroit Monday and was held from 6 to 9 o'clock at the chapel where it was viewed by thousands of sorrowing friends and employees. The body was removed yesterday morning to the Dodge home at Grosse Pointe, where the funeral was held to-day.

The honorary pallbearers included not only leaders in the automotive industry but men prominent throughout the country. In the list were Henry Ford, Edsel Ford, William E. Metzgar, C. Harold Wills, H. M. Leland, H. B. Ledyard, John Kelsey, U. S. Senator Newberry, Mayor James Couzens, E. D. Stair, Russell A. Alger, Emory W. Clark, Congressman Doremus and Ossip Gabrilowitch.

Horace Dodge survived his brother,

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Ford to Confine Inventory to Week

Will Strive for Million Schedule —Hupp and Oakland Increase Operations

DETROIT, Dec. 12—In an effort to approach the scheduled million mark for the year's production, the Ford Motor Company will continue in operation until the night of Dec. 24. The plant then will close for inventory and reopen Jan. 3. The original plan was to close Dec. 15. This company now is running better than 4,000 cars and trucks daily on a five-day a week schedule but will fall below the million program about 40,000.

Hupp Motor Car Corp. started this week on a production schedule of thirty-five a day, six days a week, an increase of ten a day. Hupp during October reached a low production record with ten daily, but the schedule jumped to twenty-five November 15. President C. D. Hastings said improved demand prompted increased schedule and said company would ship a thousand cars in December. Plans for New Year to be outlined the last week in December and from reports factory executives say big increase in production, schedule probably be entered upon January 2. Dealers throughout the country, Hastings said, report improved business and brighter outlook.

The General Motors Truck plant at Pontiac has resumed operations after a period of four weeks' idleness. About half the workers are re-employed on a production schedule calling for 400 machines for the balance of this month. According to W. L. Day, manager, normal operation may be expected soon after the new year.

Oakland Starts New Schedule

Oakland Motor Car Co., Pontiac, Mich. Wednesday began making 75 engines daily and as rapidly as skilled labor can be called back plant production will be increased until schedule of 100 automobiles daily and 150 engines is reached, date having been set as Jan. 3. W. H. Mason, assistant manager, said resumption was due to improved demand and outlook for steady increase, said the future be governed entirely by conditions and no set schedule, though present outlook gives assurance consumption will take care of 100 daily.

OLDSMOBILE ADDS FOUR

NEW YORK, Dec. 15—The newest addition to the Oldsmobile line is a four-cylinder model. The existing six and eight cylinder models will be retained. The new model is to be known as the Model 43-A and will be exhibited at the National Shows at New York and Chicago. While retaining some of the characteristics of the older four-cylinder model which was discontinued a couple of years ago, the new model is different in many respects, especially as regards the dimensions and design of the parts which reflect the trend of engineering progress during the intervening years. The engine is of the overhead valve type with the four cylinders cast in block and the cylinder dimensions are 3 11/16 x 5¼ in. The wheelbase is 115 in. and the price of the open models is $1,445,-closed models, $2,145.

Trade Rally Causes Milburn Resumption

TOLEDO, Dec. 13—An earlier demand for Oldsmobile enclosed cars than was expected by General Motors Corp. has caused that company to ask for immediate delivery of enclosed bodies from the Milburn Wagon Co., with whom the order had been placed for deliveries beginning in January. As a consequence the Milburn body plant began operations to-day for the first time since the middle of October. The order represents several million dollars.

About one-fourth of the usual force of workmen will be started on the order, the Milburn company declared, and more will be added as production progresses and the rate of delivery requires.

Buying Trend Better at Cincinnati Exhibit

CINCINNATI, Dec. 11—That business is soon to return in fair volume was indicated at the convention and equipment exhibit held here this week by the Ohio Automotive Trade Association. The 141 manufacturers who displayed equipment declare that the response from Ohio's retailers was much more encouraging than that obtained at either of the recent equipment exhibits for jobbers in Chicago and St. Louis.

The exhibit was held in a large room adjoining the Music Hall, in which the sessions were held. The meetings were held from Tuesday to Friday and the exhibit all week. Better business and the methods to be employed now and in the future were the theme of all meetings.

Several resolutions were adopted, including disfavor of long parts discounts for national buyers of trucks. One thousand and eighty registered at the convention.

200,000 OUT IN MICHIGAN

KALAMAZOO, MICH., Dec. 13—D. J. Murray, secretary of the Manufacturers' Association, reports that there are over 200,000 unemployed men in Michigan to-day who are in need of immediate work to escape suffering. He has just attended a conference of secretaries at Jackson. Detroit, Grand Rapids, Flint, Muskegon, Pontiac, Saginaw, Battle Creek and Kalamazoo were represented. Employment of labor on public works was recommended. Fifty million dollars was reported available for good roads by Frank F. Rogers, state highway commissioner, who said he favored work to begin at once.

Trade Boom to Come With Liquidations

Detroit Banker Says Manufacturer, Merchant and Farmer Must Meet New Prices

DETROIT, Dec. 11—President Emory W. Clark of First and Old Detroit National Bank addressing wholesale merchants at a dinner at the Board of Commerce declared the automobile industry was not shaky and would come through the readjustment period in good shape. He said none of the companies in Detroit were causing any anxiety.

"It is said the industry is flat," said Clark. "That is true to an extent. In this district it is running at about 30 per cent of its peak production but that is a much better showing than is being made in silks, shoes and other industries." Clark said the banking situation was much improved and said banks are extending more credit than ever before contrary to current belief. He predicted easier money in February, but said it might be March or August before there was a real increase in business.

The banks can not do it all, Clark said and insisted it was necessary for merchandise and labor costs to liquidate. He declared the larger manufacturers and merchants were not subscribing to the plan of the smaller ones in meeting low prices and said it was the former group that was seeking bank accommodations in lieu of turning their stocks into cash. Referring to the cotton growers and wheat farmers in holding their products for higher prices, Clark said he could not see where the "angel" who would pay prices they wanted was coming from.

Liquidation of labor and merchandise would be followed in 1921 by improved business he said, and within three years when the foreign exchange situation has righted itself he predicted a wave of prosperity of a magnitude undreamed of.

JORDAN INCREASES OUTPUT

CLEVELAND, Dec. 13—Jordan Motor Car Co. has started on a 90-day production program. It is an increase in the number of cars per day over the record of the last few months, but is under the program of a year ago.

E. S. Jordan, president of the company, spoke optimistically about future prospects, asserting that so long as men and food and finished products must be moved there will be a demand for cars. He said that he was confident there would be a shortage of cars next spring on account of the slow-down in production after the Ford announcement of price reductions.

LAURAINE IN RECEIVERSHIP

NEW YORK, Dec. 14—Application for a receivership for the Lauraine Magnet Corp., Inc., with a factory in Long Island City, has been granted by Federal Judge Knox.

New York Interests Seek Dodge Plant

Durant Mentioned Among Those Who May Seek Control of Big Company

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tions would not be unlikely in view of the fact that there is no member of the Dodge families in a position to take up management of the company's affairs. The attitude and advice of Haynes, the bankers said, will have large effect in shaping the attitude of the Dodge families in the event of further efforts to secure control.

Bankers familiar with previous efforts to buy control of the Dodge interests refused to divulge the names of New York financiers who have sought the property. Reports have been heard in many quarters that W. C. Durant, former president of the General Motors Corp., might become interested in such a project, but no authority has been found for this suggestion, and it has been impossible to get in touch with Durant, who is taking a rest in the South.

The Dodge Bros. Motor Car Co. was incorporated in July, 1914, with a capital of $5,000,000 by John F. and Horace E. Dodge and A. L. McMeans. McMeans retired from the company about a year ago and was succeeded by F. J. Haynes as a director. The surviving directors are Haynes and Howard B. Bloomer, who was elected after the death of John Dodge to represent the family of Mr. Dodge.

The articles of incorporation were amended in November, 1917, when the capital was increased to $10.000,000. In March of 1917 the Dodge Bros. Motor Co., Ltd., of Canada, was incorporated by the Dodge brothers and Haynes. The Dodges owned practically all the stock of the two companies, their shares being equal. At the time of the original incorporation McMeans held a few shares to meet legal requirements, but these shares now are held by Haynes.

INDUSTRY REGRETS PASSING OF DODGE

DETROIT, Dec. 14—Universal regret is expressed in Detroit at the death of Horace Dodge. In speaking of it to-day, Roy D. Chapin, president of the Hudson Motor Car Co., said:

"Horace Dodge and his brother formed one of the greatest constructive forces the industry ever has had. High ideals in manufacturing gave to Horace Dodge not only the respect of his fellow men but the unbounded good will of his workmen. The Dodge brothers had a fine reputation as manufacturers, and the splendid teamwork within their organization demonstrated the good that can be accomplished by two men working in such close harmony. Horace Dodge was a man of broad interests and an active supporter of many things outside his great organization. His love of music and art typified the real character of the man."

This tribute to Mr. Dodge was paid by Alvan Macauley, president of the Packard Motor Car Co.:

"The death of Horace Dodge is a distinct loss not only to the automotive industry but to the entire world. I never was intimate with him personally but his influence in the industry was impressive and the business of the entire nation, particularly Detroit, has suffered in his death a loss which cannot easily be overestimated."

Ericsson Creditors Ask Additional Receiver

BUFFALO, Dec. 10—A committee representing the merchandise creditors of the Ericsson Mfg. Co. met here to-day to decide what action can be taken to save the corporation from bankruptcy. The plant now is being operated by receivers and an involuntary bankruptcy petition has been filed against it by three creditors with small claims. The receivers have declined to combat the allegations of bankruptcy, although the majority of the creditors are convinced the company is solvent and could be saved if efforts were directed along the right lines.

The committee adopted a resolution to petition Federal Judge Hazel for the appointment of an additional receiver to represent the merchandise creditors and also decided to apply to the court for instructions to petition against bankruptcy proceedings. If it becomes necessary, a jury trial will be asked.

It was the sentiment of the members of the committee that if the business is developed during the next few months until normal conditions are restored, the creditors will receive much larger payments than if bankruptcy were permitted.

Grant Trade Grows; Refinancing Completed

CLEVELAND, Dec. 13—Stockholders of the Grant Motor Car Corp. have taken up an issue of 8 per cent notes that mature Nov. 21, 1921, according to George C. Hubbs, general manager of the corporation. The funds thus derived will be used to tide the company over.

Hubbs, after the meeting, said his company sold more cars this month than in the last three months and that he was confident business would gradually improve. He said that the whole situation had been aggravated by a willingness on the part of men in the industry to talk about difficulties of the present condition and by a neglect to put forth increased activity that is needed.

White Not to Cut Rate of Dividend

Statement by Vice-President Is Repudiated—Will Not Seek New Finances

CLEVELAND, Dec. 15—Reports that the White Motor Co. would reduce working hours at its plant 10 per cent on Jan. 1, and that the annual dividend rate of $4 per share would be reduced for the first quarter of next year, as contained in a statement by E. W. Hulet, vice-president in charge of production, have been formally repudiated by Windsor T. White, president of the company.

In a letter to stockholders, White declares that the statement of Hulet was made without consultation and without the knowledge of other officers of the company or the executive committee. No such reductions in dividends are contemplated, he declared, but on the contrary, that it is the great desire and expectation of the company to continue the uninterrupted regularity of its dividends on its present basis.

Earnings in the past are quite sufficient, White said, to make this policy permissible during the ensuing year. Dividends have been declared at a low rate, considering earnings of the company, he asserted, with a view to a policy of regularity. The board hoped, he said, that its policy in this respect can be maintained.

The company is in no immediate need of financial assistance, he said, its position being entirely comfortable. Existence of $10,000,000 in stock, authorized early in the year but as yet unissued, he said, had given rise to the report that the company was in the market for financial purposes. There is no immediate need for the sale of these securities, he maintained.

No direct reference was made by White to that part of the Hulet statement in which Hulet said that working hours for employees would be reduced and that salaries for salaried workers and executives would be cut 10 and 15 per cent. He did say, however, that the policy of the company in maintaining dividends at a regular rate, even when earnings might have justified increases, permitted the company to maintain regularity of output, regularity of employment and regularity of compensation for labor.

Policy Protects All Interests

It also permitted, he said, high quality of production at low cost for the benefit of customers. Every effort will be made by the board, he declared, for the protection and development of the rights of each class of those to whom it is responsible.

It had been reported here that the company would issue the $10,000,000 in stock to stockholders at par, the balance, if any, to be offered publicly, so that the company might continue full production of trucks during the winter.

Goodyear Changes Treasury Officials

Reorganization Is Made in Accordance With Understanding With Financial Advisors

AKRON, Dec. 9—Under the permanent financing program of the Goodyear Tire & Rubber Co., now being negotiated with a group of Eastern banking interests, and to be definitely announced at the adjourned meeting of stockholders in Akron, Dec. 24, the treasury department of the company has been reorganized, it was officially announced to-day.

W. E. Palmer, secretary and treasurer of the Goodyear Co. and one of the oldest officials, retired as treasurer as of Dec. 6, but will continue as secretary. In announcing this change, Vice-President G. N. Stadlemem to-day issued the following statement:

"In accordance with the understanding had with the financial group undertaking our refinancing, the duties of the treasury department have been assumed by members of the staff of Price, Waterhouse & Co., who are acting as accountants in behalf of the financial group. Accordingly W. E. Palmer has resigned as treasurer, but retains the office of secretary. N. J. Blackburn, assistant treasurer, and H. N. McCloskey, second assistant treasurer, also resign, all resignations taking effect as of Dec. 6, the date of the annual meeting of the company. Both Blackburn and McCloskey have been assigned other duties with the company."

Under the reorganization plan, T. Jackson of New York succeeds Palmer as treasurer, with C. L. Weberg as assistant treasurer, and P. H. Hart, as second assistant. All are representatives of Price, Waterhouse & Co., the accountants who are acting for the banking syndicate which will handle the refinancing of the company.

To Reduce Capital Stock

In an official notice issued to stockholders, announcing an adjourned meeting on Dec. 24, officials and directors of the Goodyear company announce that stockholders will be asked to ratify the proposed reduction of the amount of capital stock of the corporation from $100,000,000, consisting of 1,000,000 shares of $100 par value each, to $50,000,000 consisting of 1,000,000 shares of the par value of $50 each.

Stockholders will also be asked to ratify the proposed reorganization of the corporation in pursuance with State laws authorizing the "reorganization of corporations with common stock without par value," so as to permit the issuance of shares without par value. Under the new plan the reorganized corporation will have an authorized capitalization of $100,000,000, seven per cent preferred stock with the rights and privileges of the outstanding preferred stock, and not to exceed 1,500,000 shares of common stock without par value.

The terms upon which the outstanding preferred stock will be exchanged for the new shares will be one share of the outstanding preferred stock for one share of the new preferred stock, and one share of the outstanding common stock with par value for one share of common stock without par value. Stockholders also will be asked to authorize the issuance of not to exceed $50,000,000 in 8 per cent bonds or notes, and the authorization of a mortgage or deed of trust to secure the payment of these bonds or notes, the mortgage to be delivered to the trustees.

Stock Conversion Necessary

It is announced by the company that any plan of refinancing necessarily will involve converting the common stock with par value into common stock with no par value. Each holder of the present common stock will receive the same number of shares of no par value stock, to preserve the common stockholders' proportionate interest in the company.

Definite announcement of the permanent financing program to replace the temporary loan of $28,000,000 recently negotiated and payable February 15, 1921, will be made at the meeting. Officials of the company say it will probably be necessary to provide securities in the form of bonds running for a period of not to exceed 25 years and to have such securities secured by a mortgage on the property of the company.

Charles B. Ames Dies After Brief Illness

NEW YORK, Dec. 15—Charles Bernice Ames, who died Dec. 10, after a brief illness, was connected with the automobile publishing business for more than twenty years. In this field he was first associated with *The Horseless Age*, as advertising manager, having been persuaded to take up the work by his former college mate, E. P. Ingersoll, then publisher of that magazine. Mr. Ames had previously been engaged in teaching, first at Rutgers College and later at the DeWitt Clinton High School.

After several years with *The Horseless Age*, Mr. Ames became manager of *Motor* a month or two after that publication first appeared. Later he also was advertising manager of *Motor Boating*. He remained with *Motor* and *Motor Boating* until 1909, when he bought a part ownership in *The Horseless Age*, Mr. Ingersoll having sold out and retired from the company. In 1915, with another change of ownership of *The Horseless Age*, Mr. Ames returned to *Motor* as publisher of that magazine, resigning about three years later to become vice-president of Motor Life Publishing Co.

Mr. Ames was born in Fort Edward, N. Y., in 1865. He graduated from Williams College with the class of '85. He ranked high in scholarly attainments and was rewarded with membership in Phi Beta Kappa. He leaves a wife and married daughter.

Roads Have Share in Business Slump

Louisiana Official Believes Improvement Will Bring Firmer Basis—Outline Plans

NEW ORLEANS, Dec. 13—Among the most important matters to be taken up by the convention which has been authorized to rewrite the Louisiana state constitution next February, will be the construction and maintenance of a statewide good-roads system, at a cost ranging from $28,000,000, as provided in one plan, to $35,000,000, as provided in another. Automobile manufacturers, distributers and dealers, motor leagues and other organizations of motorists have been invited to take part in the discussions at this convention.

Governor John M. Parker issued this invitation to the men of the automotive industry at a recent meeting of Ford dealers here. The Motor League of Louisiana, the New Orleans Automobile Dealers' Association, the Jefferson Highway Association, and other organizations are now at work on plans to be presented to the constitutional convention.

The only question in the entire matter which will cause any argument before the convention will be the method of raising the money, one plan being to assess a general property tax, extending over seven years, and the other a twenty-year bond issue. Proponents of each of these financing plans are a unit on the fact that the state-wide road system must be built, and if either faction on the financing shows any gain of strength over the other both have said they will unite to put the stronger project through.

One of the most active of the motorists' organizations in this work is the recently re-organized Jackson Highway Association, of which Col. T. C. Campbell is vice-president for Louisiana. The local branch of this association stands for the elimination of the parish roads, which form a patchwork of all but useless highways all over the state, and Col. Campbell is of the opinion that the work should be done by bond issue, and thoroughly supervised by engineers of the Federal Government. He said:

Interstate Roads Important

"If we had a state-wide system of good roads to-day, connecting with interstate roads at our state boundaries, business conditions in general would be better, the automobile industry throughout Louisiana would be on a firmer basis.

"Contracts for this road building should be divided into five or ten mile strips, and each strip allotted to a separate contractor, both to speed the work to completion and to establish a rivalry between the contractors which would work toward better construction of the whole. This plan, also, would make inspection by the Government engineers easier, and repair of defects, or replacement of bad work—if any were found—much more rapid."

Trade Commission Recommends Suits

Names Five Implement Associations in Report on Price Fixing to Congress

WASHINGTON, Dec. 15—Evidence purporting to show that there has been a combination of 200 manufacturers of farm implements during 1916-18, inclusive, to fix prices "higher than the increased cost of manufacture and materials," and that dealers had made local agreements supporting the practice, all of which is alleged to be in restraint of trade, has been presented to Congress by the Federal Trade Commission, and is now under consideration.

Judicial proceedings against five organizations of farm implement manufacturers and dealers, and the reopening of the Government's anti-trust prosecution of the International Harvester Co., are recommended in the report, which is in response to a Senate resolution ordering an inquiry.

Those against whom court proceedings were recommended were the National Implement & Vehicle Association, the Southern Association of Wagon Manufacturers, the Carriage Builders' National Association, all organizations of manufacturers; and the National Federation of Implement & Vehicle Dealers, and the Eastern Federation of Farm Implement Dealers, retailers' associations. The International Harvester Co. did not enter the activities relative to price fixing on harvester machinery, the report declares, but did so as to other implements produced.

Alleged correspondence between manufacturers, which was held to show price fixing agreements, was made public by the Federal Commission as part of its special report. This correspondence, as given out, was signed apparently by high officials of companies in the associations and contained passages in which some of the transactions between firms were referred to as illegal.

Increased Income 152 Per Cent

The commission charged that the implement makers, partly as a result of the alleged combination, had increased their net income for 1918, 152 per cent above the 1914 mark and profits on capital from 9 per cent to 17.1 per cent, while dealers' prices had increased 62 per cent. Owing to the increased prices of farm products during the period under consideration, the commission said, the prices charged among the implement trade did not reduce farm profits materially. Opinion was, however, that they might do so during a period of falling prices.

Assistance was rendered the manufacturers and dealers in their maintenance of prices after the armistice by implement trade papers and the Agricultural Publishers Association, the report said, who were led into this position under the cover of bringing about uniform cost accounting, uniform terms of sales and standardization of products.

NORTHWAY GIVES BONUS

BOSTON, Dec. 11—Employees of the Northway Motors Corp. at Natick received a stock bonus of approximately $6,000. The distribution was of the common stock, ranging from one to five shares per employee.

It was provided, however, by the company in this distribution that if for any reason an employee does not wish to keep his stock, the company will take it from him and allow him $15 for each share of bonus stock.

McCORMICK DENIES COLLUSION

CHICAGO, Dec. 15—Previous denials of collusion with competitors regarding prices were reiterated by Cyrus H. McCormick, chairman of the International Harvester Co.'s board, in reply to the Federal Trade Commission's report to Congress. "We contend," he said, "that the commission has acted without warrant in seeking to revive the Government's suit. This report presents no fact on this subject except its distinct finding that the company's percentage of trade in lines which the commission accuses it of dominating continues steadily to decrease.

"As the record shows, and as we have previously stated, the Federal Court's decree gave this company a definite period in which to make certain changes in its business. That period has not expired."

King Motor Assets Sold for Half-Million

DETROIT, Dec. 13—Assets of the King Motor Car Co. were sold to-day to Charles A. F. Finnegan of Buffalo, for $500,000, of which $100,000 was in cash. The plant will be operated with A. Weber of the Finnegan organization in charge and D. D. Calvert as factory manager in active control. The plant has been moved from the Jefferson avenue location to the plant of the Crucible Steel Co. on Conant avenue. Calvert says the new owner has not formulated any plans for next year in so far as production schedules are concerned. No cars have been built this month, but work was finished in November on thirty cars which were incomplete at the time the receivership bill was filed.

FREDERIC IVER JOHNSON DIES

FITCHBURG, MASS., Dec. 13—Frederic Iver Johnson, son of the founder of Iver Johnson's Arms & Cycle Works of this city and who succeeded his father as president of that company, died at his home here of heart trouble. He had recently been interested in pneumatic tires, having left the Iver Johnson concern some years ago.

Motorcycles Stir British Enthusiasm

Buying Hesitancy Less Than at Automobile Exhibit—Four American Cars Shown

LONDON, Dec. 1 (*Special Correspondence*)—The attendance and the general atmosphere on the opening day of the sixth International Motorcycle Show at Olympia, which opened on Nov. 29th, were both far more encouraging to exhibitors than was the case on the first day of the Automobile Show which closed a fortnight earlier, and the number of visitors with buying intent has since increased day by day. There was not the same hesitancy on the part of buyers, and although the number of orders actually placed by private individuals was not comparable with the first few days of last year's show, prospects for 1921 have so far been distinctly encouraging to the majority of exhibitors.

Three nationalities are represented in the exhibits of complete machines, American, Belgian and British. The former consist of Harley-Davidson, Henderson, Indian and Reading-Standard, each of whom has a good display, the first three on excellent sites. Belgium has a solitary representative in F. N., the remainder of the 98 stands where solo machines and sidecar outfits are shown being occupied by British products. The solo machines total 370 of all nationalities and the sidecar outfits 170.

On four stands motor attachments for pedal cycles are shown; motor scooters on five; sidecar carriers for parcel delivery on seven, and three-wheeled light cars or runabouts on nine, the latter machines being classified as motorcycles for taxation and exhibition purposes, though having little or no resemblance to them except, in most cases, the air-cooled V twin engines.

From an engineering standpoint the show is disappointing, for apart from detail improvements, the majority of the machines do not differ remarkably from those of last year. The main feature of the show is the increasing popularity of lightweight machines (under 200 lb. and with two-stroke engines of 2¼-2½ h.p.); there are approximately 50 firms making these, prices ranging from $230 to $400.

Scooters Biggest Development

But despite lack of real progress in the normal types, there are examples of motor scooters which show development that will probably lead to a new type of machine; this will appeal to an entirely new and very big market, the latter consisting of men who require what may be termed a miniature car on two wheels, resembling the present day motorcycle in light weight, air-cooled single or twin cylinder engine, handle bar steering and small storage space, but having pronounced advantages in respect of comfort, cleanliness and protection for rider, engine and transmission.

New York Receivers for Commonwealth

New York State Assets Protected in Latest Legal Proceeding in Controversy

NEW YORK, Dec. 12—Justice Cohalan of the Supreme Court has appointed Lawrence M. D. McGuire and James E. Landy temporary receivers of the assets in this city of the Commonwealth Finance Corp., a South Dakota company, to protect the New York State assets. The receivers are required to give bond of $100,000. This is the latest of the legal steps which have shaken the company for several months in a struggle for control.

First in the controversy came the ousting of Sargent & Co. from the management by the purchase by Henry D. Tudor and Ormsby McHarg of 15,500 shares of stock for $218,000. This was in January last. Six months later the Tudor faction removed McHarg as secretary-treasurer and practically excluded him from the offices, even as a director. Immediately afterwards McHarg made charges of mismanagement, fraud, misappropriation of funds and falsification of books against the Tudor management and Tudor retaliated with similar charges against McHarg.

About this time a stockholders' committee, with headquarters in Minneapolis, was organized with James E. Carlson as secretary. This committee refused to join with McHarg, alleging that his hands were not clean, but began proceedings in the South Dakota courts against Tudor. It asked that the directors be removed, that "the illegal bonus stock" be cancelled, that the directors pay back into the treasury or make good "losses and misappropriations" to the amount of over $1,000,000, that an election of directors be held at which "only those may vote who have paid for their stock," and that in the meantime a receiver be appointed to carry on the business until a new board could be elected.

Court Enjoins Directors

The evidence was heard in the Circuit Court at Huron, S. D., and the judge entered a decree against Tudor and his associates which said that they had "been guilty of gross mismanagement, malfeasance and misappropriation of funds," and that under their control the assets were "in great and imminent danger of dissipation and loss." The decree granted an injunction restraining Tudor and his associate directors from directing the affairs of the company. Coe I. Crawford of Huron and Z. S. Freeman of this city were appointed receivers under these proceedings.

Tudor alleges that the Minneapolis committee, which is seeking the support of stockholders in its work, was organized to help McHarg get "revenge" and that its chief counsel, a Minneapolis lawyer named Selover, is a legal associate of McHarg. He also asserts that several members of the committee were not stockholders of the corporation when the committee was formed. He has sent out circulars to stockholders asking their support and promising payment of a dividend when the controversy is adjusted. The Minneapolis committee is seeking to prevent payment of this dividend on the ground that it would have to be paid out of capital.

The main offices of the company are in this city, as are most of its assets, and the receivers appointed by Justice Cohalan will be in charge until some satisfactory adjustment is made.

HELDT TO REVIEW CAR DEVELOPMENT

NEW YORK, Dec. 12—P.M.Heldt, engineering editor of AUTOMOTIVE INDUSTRIES, has accepted an invitation from the publishers of the Encyclopedia Brittanica to prepare the article on motor car development during the last ten years, which will be used in three supplemental volumes to be brought out as soon as possible. Only one previous article on automobiles has been printed in the encyclopedia and that was prepared by Edward Shrapnel Smith, editor of Commercial Motor, London. Heldt's article will supplement this and an American was chosen to write it because of the unequalled development of the industry in this country.

Piccard, Pictet Fails; $5,000,000 Involved

NEW YORK, Dec. 11—A dispatch from Geneva, Switzerland, announces the failure there, for $5,000,000 of Piccard, Pictet & Cie. one of the largest Swiss engineering firms. The firm built the Palace at Geneva in which the present meeting of the League of Nations is being held. It also built the first turbines installed at Niagara, and during the war manufactured munitions for the Allies.

For some years it has also been engaged in the manufacture of an automobile known as the Pic-Pic, a machine with a single sleeve valve engine, built under the Burt-McCullun patents. The Pic-Pic car at present being imported into this country is of French manufacture, produced under license from the Swiss firm by the Gnome and Le Rhone Co.

HIBBS RECEIVER NAMED

FORT WORTH, TEX., Dec. 12—Hibbs Rubber Co., Inc., went into the hands of a receiver, Dec. 10, upon the application of a machine company, which alleges an indebtedness of $509 to itself and $66,000 to other concerns. C. C. Gumm was named receiver by District Judge Roy. He has taken charge of the plant here, which manufactures automobile tires.

Investigation Asked of Boston Companies

Heavy Losses by Commercial and Mutual Arouse Stockholders to Action

BOSTON, Dec. 11—As an aftermath of the blowing up of the Massachusetts Motors Co. that had the agency of a number of cars in New England the report of the trustees of the Commercial Finance Corp. and the Mutual Finance Corp. shows that it cost them hundreds of thousands of dollars through their dealings with the Motors company.

As a result of the report one of the stockholders has written to District Attorney Pelletier enclosing a copy of it, asking if he would investigate the possibility of criminal negligence in handling the finances, and a letter also has been sent to the trustees asking them what they propose to do.

The report from the trustees sent to the stockholders says in part:

"The paid-in capital of the Mutual Finance Corporation has depreciated about 34 per cent, and that of the Commercial Finance Corporation about 41 per cent.

"The following tabulation shows the approximate financial situation of the Commercial Finance Corporation as of Dec. 1:

Capital paid in cash Dec. 1, 1920		$2,077,964.31
Loans listed as of doubtful value	$1,213,999.16	
Deduct charged off as bad	547,271.47	547,271.47
Balance	$666,727.69	
Estimated realizable	363,459.46	
Doubtful or bad as of Dec. 1, 1920	$303,268 23	303,268.23
Possible impairment		$850,539.70

The committee says, concerning the Commercial Finance Corporation's affairs:

"The amount charged off as 'bad' includes the indebtedness of the Massachusetts Motors, Inc., amounting to $493,792.51. That company is now in bankruptcy, and the amount charged off is after allowance for the present value of the assets in bankruptcy. Your committee has collected to Dec. 1 $488,-981.85; have paid indebtedness to the Mutual Finance Corporation and others for loans of $257,231, and has invested $178,110 in United States Victory Bonds and Certificates of Indebtedness.

"The following tabulation shows the approximate financial situation as of Dec. 1:

Capital paid in cash Dec. 1, 1920		$2,096,846.2f
Loans listed as of doubtful value	$1,138,390.55	
Deduct charged off as bad	154,692.90	154,692.90
Balance	$983,697.65	
Estimated realizable	412,397.49	
Doubtful or bad as of Dec. 1, 1920	$571,300.16	571,300.16
Possible impairment		$725,993.06

Post Office Praises Trucks and Planes

Would Advance Use of Both in Carrying Mails—Urges Better Highways

WASHINGTON, Dec. 13—Postmaster General Burleson's annual report to Congress emphasizes the essentiality of the motor truck in the economical and efficient operation of the Postal Service. He has advocated the complete motorization of the post office department's delivery equipment, universal license fees, load restrictions on highways and uniform traffic regulations.

Burleson believes that the success attending the handling of parcel post and other mail matter in such large volumes is the direct result of a carefully developed motor transportation system. More than fifty per cent of the aggregate number of vehicles employed in the Postal Service are motor propelled.

The Government-owned motor-vehicle service has been gradually extended until on July 1, 1920, it was in operation in 163 cities. In 50 of these six or more trucks are in use, while in the remainder of the cities less than six trucks are engaged in the transportation of mail. The service requires 2,606 trucks, ranging in size from three-eighths to 5-ton capacity. The number of supervisory officers, clerks, mechanics, chauffeurs, and garage men necessary in the operation and upkeep of these trucks total 3,880. Government-owned service is being extended as rapidly as motor-truck equipment becomes available, and by January 1, 1921, it will have been established in 10 additional cities.

Takes Over Truck Body Plant

During the past year the cost of standard screen bodies secured under contract for use on mail trucks has increased approximately 100 per cent, and considerable difficulty has been experienced in obtaining deliveries within a reasonable time after an award was made. With a view to reducing construction cost and also with the object of securing an adequate supply of bodies, the department has leased the plant of a failing contractor for body construction and is manufacturing its own mail-truck bodies. It is believed that a more durable body can be produced in the plant operated under the supervision of the department than is the case where bodies are secured under contract and the cost of construction will be less than that now being paid for body equipment obtained under contract.

"The interruptions and failures in the Rural and Star Route Services, which during the periods of bad weather continue to occur with too great frequency," stated Burleson, "are evidence that the successful operation of these services is dependent upon the character of the highways on which they are performed, and therefore the department is deeply concerned in the improvement of the highways, not only because of the economy of the operation, but because it would permit the more rapid extension of service to all possible rural patrons and insure to them the delivery and collection of their mail on expeditious, dependable, and uninterrupted schedules. Through such improvement of the highways and their use in the transportation of foodstuffs, it would be possible to convey an average of not less than 1800 lb. a day per route, as compared with 24 lb. at present conveyed."

Hope for Scientific Highways

It is only through the efficient use of improved highways that the Postal Service may perform adequate service to the people. In view of the large continued Federal appropriations to aid the States in the improvement of their highways and the constantly increasing appropriations for this purpose which are being made by the States, there is hope that eventually the highways of the country will be efficiently and scientifically improved and used. Furthermore, uniform traffic regulations, universal license fees, and load restrictions should be required wherever Federal aid is provided for construction or improvement.

The Postmaster General pointed out the necessity for encouraging researches into aviation and Government assistance in the development of commercial air lines. He stated that the utilization of discarded war training planes would cut the operating cost of the air mail service about forty per cent. These salvaged war planes that are now being prepared for the mail service will carry 6 lb. of mail with 240 horsepower motor and have a cruising radius of five hours.

It has cost the Post Office Department $553,156.10 to operate the Air Mail Service, including interest on investment, the writing off of losses for planes and equipment damaged beyond repair, and including every conceivable expenditure in connection with the flying of planes. It is a notable fact that this expenditure advanced the delivery of 23,463,120 letters, sixteen to twenty-four hours, at a great saving over train service. The Department spent $646,143.70 for the adaptation of surplus military planes to air mail work and the purchase under bids of needed modern equipment.

Would Encourage Air Mails

The Postmaster General has recommended an amendment to the law which would permit the making of contracts for carrying mail by airplane, even at increased cost over train service, considering the commercial benefits to be derived from the greater expedition of mail. He also suggested more liberal contract service and extension of the system of Government routes as follows: Boston to Detroit, via Buffalo; Chicago to Los Angeles, via Kansas City; St. Paul—Minneapolis to Seattle; and St. Louis to New Orleans, via Memphis.

The Navy Department has agreed to deliver to the Post Office Department 15 Caproni planes mounted with three engines, capable of carrying a ton and a quarter of mail.

Industry Believes Upward Trend Near

Adjustment of Low Crop Prices and High Wages Determining Factor

(*Continued from page* 1236)

though this had not occurred. The price of what the farmer wants to buy must come down to the level of what he has to sell before a balance can be restored. Until that time comes the farmer will buy only what he has to have and he will be in no mood to bandy words with salesmen. It would seem logical that this should apply with especial emphasis to automobiles.

When the agricultural population is mentioned it means the growers of grain, cotton, sugar, rice, wool, hogs and cattle and scores of other commodities. The ramifications of this industry affect probably half the population of the United States and the purchasing power of more than 50,000,000 people will be correspondingly cut.

Another important factor in the situation which must be readjusted before equilibrium can be restored is the wage question. High wages have a large bearing on costs of manufacture and the wage earner must accept the inevitable reduction before the cost of living can go back to anything like the pre-war level. The laborer is unwilling, naturally enough, to accept a cut in wages before he can be shown that there has been a corresponding drop in the cost of the goods he has to buy.

Notwithstanding all the unfavorable elements, however, the United States should congratulate itself upon the fact that it is coming through the post-war period with so little of disaster. The dislocation of industry has been much less severe than might have been expected and it is preliminary to a long period of prosperity. This prosperity will be less spectacular than that which came with the war and immediately after the armistice, but it will be built upon a solid foundation and it will last—unless the world is shaken by another great war.

The automotive industry will weather the storm with flying colors and it will have its full share of the harvest which is to come. But to reap its rewards it must be conducted along sane and conservative lines and the men engaged in it must work hard if they are to prosper. All they can do now is to strike hard for all the business available, for there is more of that business than appears on the surface, and hang on to await the dawn of a brighter day.

PERKS CANTON RECEIVER

CANTON, OHIO, Dec. 13—G. W. Perks of Akron has been appointed receiver for the Canton Automobile Parts Mfg. Co. Two suits were brought for a receivership, one by a creditor and the other by three directors.

Horace Dodge Death Is Shock to Friends

Early Mechanical Training Fitted Him for Industrial Eminence —Began with Ford

(*Continued from page* 1237)

John, by less than eleven months. The latter died at the Ritz Carlton Hotel in New York, January 14, after a short illness from pneumonia following influenza. The two brothers had gone to New York for the automobile show and became ill almost at the same time. Horace was two years younger than John.

The success of the Dodge brothers in the automobile industry had been spectacular. In less than twenty years they accumulated a fortune of many millions.

When the twentieth century dawned they were manufacturing automobile parts in a small plant, employing only eleven men. Soon after they began work they made an arrangement with Henry Ford whereby they were to take a $5,000 interest in the Ford automobile plant. They sold that $5,000 interest to Henry Ford in July, 1919, for $27,000,000.

Horace E. Dodge was born at Niles, Mich., May 17, 1868, and with his brother, John, spent his early life at a bench in his father's machine shop where they learned their trade.

The family later moved to Port Huron where the father started a machine shop, and it was here the brothers gained first knowledge of internal combustion engines, the father specializing in marine engine work. The brothers came to Detroit in 1886 and went to work for the Murphy Engine Co. at $18 a week, remaining there until 1894, when they went to Windsor, Ont., and became machinists for the Dominion Typograph Co. Their ability attracted the attention of Fred S. Evans, a Detroit manufacturer, and when the brothers invented the first ball bearing bicycle Evans joined them in the Evans & Dodge Bicycle Co., leasing the Dominion plant and operating it as their first business venture.

First Interest Brought $10,000

In 1899 the Dodges sold their interests in the Canadian plant for a sum between $5,000 and $10,000. They removed the plant machinery to Detroit where they started a machine shop in 1901, employing twelve men. A few years of hard struggling and near-failure were followed by a period of prosperity. They secured large quarters and enlarged their facilities, continuing the business in Hastings Street until 1910 when the present Dodge Bros. plant was started. It was in the Hastings Street plant the brothers began their careers as automobile builders, their first contract being for 3000 sets of transmissions for the original Olds runabout.

When Henry Ford organized the Ford Motor Co. in 1902 he persuaded the Dodge brothers to engage in the manufacture of engines, transmissions and steering gear, and as the Ford business increased they were compelled to add to the Hastings Street plant until at the time they left it in 1910 it was the best equipped machine shop in Detroit.

Worked on Ford Engine

While perfecting his engine, Ford met with many difficulties and frequently consulted the Dodge brothers, who are credited with much of the success of the Ford engine. When he organized his company he persuaded the brothers to take an interest, and they agreed to buy $5,000 worth of stock, to be paid for out of their profits on the manufacture of 650 Ford chassis. The engine was perfected and manufacture of Ford cars was started. A short time later the Dodge brothers bought the Ford stock owned by A. Y. Malcomson for $175,000, Malcomson having paid $25,000 for it.

In 1908, when Ford capital was increased to $2,000,000, the Dodge brothers each received 1000 shares of $100 par value. In 1917, when the Dodges enjoined Ford from turning profits back into the business, testimony showed their holdings to be worth $36,000,000, beside which they had received $5,500,000 in dividends. When Ford purchased the minority interests in his company in 1920 the Dodge brothers received $27,000,000 for their 2000 shares and their share of the 1916 profits.

Disagreement with Ford arose in 1907. With hard times approaching and the Dodges' plant operating almost exclusively on Ford products, they feared inability to weather the storm in the event the Ford company met with difficulties and sought to have Ford absorb their plant. The latter delayed the issue a whole year and friction increased until what they declared to be Ford's efforts to pare the profits of Dodge brothers resulted in their determination to enter the automobile field. They notified the Ford company that it must make its own engines, transmissions and differentials, and the brothers began active preparation for entering the automobile field, starting construction in 1910 on the $1,000,000 plant now occupied, completion of which required more than two years. Production of Dodge cars was begun in 1914, the brothers that year severing active connection with the Ford company.

Fourth Place in 1917

Dodge Bros.' product rapidly took a leading place in the automobile field and from eighth place in point of production in 1915 the plant rose to fourth place in 1917, and now is probably second only to Ford, the present normal production being about 625 cars a day. The phenomenal growth of the company is shown in the fact that the plant now represents an investment of $20,000,000, the buildings covering 75 acres.

During the war Dodge Bros. built, in a period of four months, a munitions plant, pronounced the finest in the country, at a cost of $10,000,000, covering 11 acres, and employing 8000 men.

Army Truck Sale Threatens Market

House Sub-Committee Considers Plan to Sell Vehicles Now in Camps

WASHINGTON, Dec. 15—Between 30-,000 and 40,000 motor trucks owned by the War Department will be dumped on the American market within the next year if Representative Anthony of Kansas is able to put over a project he has devised to promote economy. Anthony is chairman of the sub-committee of the House committee on appropriations which is considering how much money will be required to meet the military needs of the Government the coming year.

It is the contention of Anthony that the Army has vastly more trucks than it needs and that the public can absorb them without difficulty. He does not seem to be concerned about the future of the truck industry, which is now virtually flat because of the depression which has accompanied post-war readjustment. He said he "guessed" the "market can stand it."

Most of the trucks the army has are of more than two tons capacity and they are stored chiefly in Eastern camps. Many of them never have been used.

The appropriations committee is determined to slice about $400,000,000 off the War Department budget. Anthony and some of his associates believe considerable revenue can be derived from the sale of these trucks. If a clause to this effect is not inserted in the appropriations they will seek special legislation.

Asked to-day why the major part of these trucks could not be taken over by the Post Office Department and the Bureau of Public Roads, Anthony asserted these branches of the Government service already had more motor vehicles than they could use. As a matter of fact, however, Postmaster General Burleson has recommended that the entire department be motorized, and the Bureau of Roads has asked for many more trucks.

Studebaker Makes Further Price Cut

SOUTH BEND, IND., Dec. 13—The Studebaker Corp. has reduced prices on two models of its Light Six series. The Landau roadster is cut from $1850 to $1650 and the sedan from $2450 to $2150.

KELLY-SPRINGFIELD TRUCK CUT

NEW YORK, Dec. 13—Reductons in the prices of Kelly-Springfield trucks have been announced by Hare's Motors, Inc., ranging from $100 on the 1½-ton model to $400 on the 6-ton size. The new prices on the chassis at Springfield, Ohio, are, 1½-ton from $3000 to $2900; 2½-ton, $3500 to $3250; 3½-ton, $4650 to $4200; 5-ton, $5150 to $4900; 6-ton, $5500 to $5100.

Belgian Show Draws 309 Exhibitors

Fourteen American Cars Represented in Seventy-six Shown —Draws Large Attendance

(*By Cable to* AUTOMOTIVE INDUSTRIES)

BRUSSELS, Dec. 13—Burgomaster Max, one of the civic heroes of the war, opened Belgium's first post-war automobile show, the only Continental exhibition of the year, in the Cinquantenaire Palace in this city Saturday. King Albert, one of Europe's most enthusiastic motorists, visited the show to-day.

The exhibition is International in character, covering the entire automotive industry, and brings together 309 exhibitors, establishing a new record. Seventy-six passenger car manufacturers have stands. Forty of them are French, 14 American, 10 Belgian, 6 Italian, 4 British, 1 Swiss and 1 Dutch. There is not a single German or Austrian exhibitor. The American firms showing passenger cars are Buick, Chevrolet, Comet, Maxwell, Chalmers, Dodge, Overland, Oldsmobile, Packard, Paige, Saxon, Stephens, Westcott and Willys-Knight.

The show marks the return of the Belgian automotive industry to pre-war conditions. With only a few exceptions all the Belgian factories are now producing on the same scale as before the war. The industry has not grown and a few new firms have appeared, but three companies have not returned to the automobile business. They are Pipe, Germain and Sava.

The Belgian automobile factory buildings were not destroyed in the war, but the machinery was taken away by the Germans and twenty-five months have been necessary to assemble new equipment, lay out designs and get into production.

Despite this handicap, the Belgians have revived as quickly as the French or British. Minerva, the largest automobile factory in Belgium, is running on the same scale as before the war and producing up to 75 per cent of the factory capacity. Metallurgique also is in full production.

Belgian Car Market Open

Belgium is the only country in Europe which has maintained pre-war import duties, and as a result the market is being extensively invaded by American manufacturers. Before the war practically no American cars were sold in this country, while now twenty firms have selling organizations. American cars are found everywhere. Cadillac maintains permanent display in the lobby of the leading Brussels hotel. Belgian manufacturers two years ago protested against the invasion of their market, but the government has refused to give them protection.

Although general depression is felt here the tone is optimistic and trade conditions are rather more satisfactory than in the other countries of Europe. Attendance at the show thus far has been good, and much buying is expected before it closes.

Ansaldo, the biggest engineering concern in Italy, has entered the automobile field and exhibits for the first time a light, cheap production car with overhead valve, four-cylinder engine, 70 x 120 mm. (2.76 x 4.73 in.), with three-speed gearset and Hotchkiss drive.

Fonck, the famous French aviator, has come into the automobile field with a high class model of the sporting type equipped with a four-cylinder engine, 80 x 130 mm. (3.15 x 5.12 in.). Another model of similar design has eight cylinders in line, four-wheel brakes and left-hand steering gear, the product of an engineer from Hispano.

Renault Modifies Model

Renault has modified his Six and now has cantilever springs without shackles. Lorraine-Dietrich shows a new light, cheap-production Six with modifications, now ready for production. Delivery is promised in February. Lorraine has absorbed Clement-Bayard.

Excelsior has brought out a new high grade six with cantilever springs and four-wheel brakes. Metallurgique shows a new four-cylinder model, 100 x 160 mm. (3.94 x 6.30 in.) of unit construction with four-speed gearset. The engine will be replaced later by a six of the same dimensions. Four-wheel brakes are used, with semi-elliptic springs. The car uses complete Bosch equipment.

Daoust is in production of a cheap popular car and is also building a sporting type with an engine of 183 cu. in. with overhead valves. Miesse has two new models with four and eight cylinders-in-line, detachable head, overhead valves and four-wheel brakes.

Parts of American Manufacture

The engines used generally are of Belgian production, but the clutches and gearboxes are imported from America. No Belgian organization is equipped for quantity production of cheap cars. A majority of the makers prefer to make a limited number of high class vehicles. There is no battery ignition in Belgium and all final drives are spiral bevel.

All the trucks shown are of foreign make, mostly French. Farm tractors are beginning to arouse interest, but none are produced in Belgium. There are a few farm lighting sets at the show, including the American Delco.

Firestone Net Profits $9,396,912 for Year

AKRON, Dec. 15—The Firestone Tire & Rubber Co. made a net profit during the past fiscal year of $9,396,912 after setting aside $8,151,749 for inventory losses, according to the annual statement to the stockholders issued to-day.

The total sales amounted to $114,980,969 which is an increase of 26 per cent over the sales of last year. According to the statement the total assets amount to $107,404,200.

Banks Add to Share in Standard Parts

Stockholders' Share in New Financing Cut $1,000,000—Subscriptions Near Close

CLEVELAND, Dec. 13—The plan for financing the Standard Parts Co. has been amended and it is now hoped to have the receivers who were appointed in September on the application of a stockholder, discharged early in the new year. The amended plan provides for increasing the amount of prior lien stock from $3,000,000 to $4,000,000, while the amount of Class A Preferred was reduced from $6,500,000 to $5,000,000, making the total $9,500,000.

The proposed syndicate of brokers will take $4,200,000 of the 8 per cent prior lien preferred instead of the $3,000,000 provided in the first refinancing plan. The stockholders will be required to take $2,000,000 of the second preferred instead of the $3,000,000 originally sought from them.

The original refinancing plan was drafted and submitted to the stockholders in October. They were given to Dec. 1 to subscribe to the $3,000,000 originally set aside. It was announced that of the $2,000,000 stock now set aside for the stockholders to take all but $110,000 has been taken up. With the banks giving a $4,000,000 credit, conditioned on the stockholders taking $2,000,000 of the new stock, and the brokers underwriting $4,200,000 worth, the company will have $10,200,000 as a nest egg for the readjustment period.

The decision to amend the refinancing plan was made at a meeting of interested persons in the office of the Cleveland Trust Co.

Rubber Companies Deny Consolidation Report

NEW YORK, Dec. 13—Reports that a consolidation is imminent of the Kelly-Springfield Tire & Rubber Co., the Goodyear Tire & Rubber Co. and the B. F. Goodrich Co. are emphatically denied by officers of the three rubber companies. It is assumed the story results from the fact that Arthur Sachs of Goldman, Sachs & Co. has been elected to the directorate of all three corporations. The Goodyear and Goodrich companies have a greater manufacturing capacity than they will need for some time, and the Kelly-Springfield is now completing a new plant which will have a larger capacity than its three present factories.

Another report that Henry Ford had entered into negotiations with the Kelly-Springfield company for the purchase of its Akron plant also is emphatically denied by officers of the tire company.

The Kelly-Springfield company has declared a quarterly dividend of $1.50 on the 6 per cent preferred stock of the corporation. The dividend is payable Jan. 1 to stockholders of record Dec. 17.

Farmer Convention Analyzes Conditions

Find Crop Losses and Loss to Industry Unequal—Bank Position Studied

INDIANAPOLIS, Dec. 10—The co-operative movement among farmers through the organization known as the American Farm Bureau Federation, was well demonstrated here during the last three days when this organization representing over 1,000,000 farmers from forty states, met in its second annual convention with an attendance of over 600 delegates.

The American Farm Bureau Federation is a federation of farm bureaus which are generally headed by an agricultural college graduate who is an active worker in his locality. This new organization gives promise of being by far the most potential ever connected with American agriculture. It is a business organization and is attacking every important problem that has the ultimate benefiting of agriculture in view.

Governor P. G. Harding of the Federal Reserve Board was present to answer the criticisms of the farmers that the Federal Reserve Banking system was favoring the manufacturing and business interests of America rather than the farming interests. Governor Harding answered this by showing how loans in the New York area were reduced during the last year by approximately $1,500,000,000, while loans in agricultural areas were increased by approximately $5,800,000,000. Federal Reserve Banks in such industrial centers as Philadelphia, Boston, and Cleveland each advanced approximately $250,000,000 to Federal Reserve Banks in agricultural areas to assist in financing the farmer. Governor Harding was emphatic in stating that there had been no restriction of credit by the Federal Reserve organization to the farmer.

Farm Buying Could Halt Slump

He was of the opinion that the present depression is largely an evidence of the lack of buying on the part of the farmers.

Some conception of how the farmer is analyzing present-day situations was given by J. R. Howard, president of the American Farm Bureau of Federation, and a farmer of high standing. Howard declared that the present reduction in prices on three crops—corn, winter wheat and oats—meant a loss of $7,000,000,000 to the farmers of the country. He cited the drop in the price of corn from $1.85 a bushel to 35 cents a bushel which applied to the 3,200,000,000 bushel crop this year. This gave a loss alone of approximately $5,000,000,000. With wheat the loss is another billion, and with oats it is practically the same.

The farmer cannot quite reconcile the reduction in prices which he is facing on his products with the much smaller losses or reductions of 10 to 25 per cent which the manufacturer is making in his products, he declared. Howard asserted the farmer during the period of the war, in spite of the impressions of the general public to the contrary, did not fare comparably with industry. He advocated a banking system which would give farmers a credit that would extend over the productive year and also through the consumptive year. He even went so far as to declare that if present banking organizations would not furnish this that the farmers would be compelled to organize their own banking institutions for this purpose.

Urge Road Construction

Henry Sherley, secretary of the Federal Highway Council, urged the necessity of asking Congress to make appropriations for road improvements. His plan was to have the Federal Government construct certain roads and charge local authorities with maintenance of their own sectors. Deal urged the harmonization of road construction and maintenance between the Federal, State and county governments.

The action of the Federation on the resolutions submitted gave some indication of the views the farmer is taking on many of the questions of the day. Some of these are in purpose as follows:

Farm Bureaus of each State and county to appoint committees to consider taxation; and the American Farm Bureau Federation to give special attention to Federal taxes through its legislative department.

Railroads should give preferential rates on agricultural limestone, rock phosphates, and soil fertilizers.

The Federation is opposed to the Pittsburgh plus plan as a basis for its steel prices.

The farmers are opposed to guaranteeing a fixed return to public utilities and railroads on a cost plus basis.

The Federation reiterated its unalterable opposition to the enactment of any kind of daylight saving law.

There should be national legislation to assure the farmers the full, free and unrestricted right to bargain collectively.

From this Congress must enact a tariff law which will give the farmers that measure of protection which may be necessary to equalize the difference between the cost of production in this country and the cost in competing nations.

For Profits and Income Tax

The attitude of the Federation with regard to Federal taxes, as expressed by H. C. McKenzie, chairman of their taxation committee, is that 75 per cent of the Federal taxes should be income and excess profit and 25 per cent consumer taxes. The Federation favors a continuation of the present excess profit taxation scheme. The Federation is opposed to sales tax. McKenzie recommended that if the present income and excess profit taxes do not raise sufficient revenue, that the rates be raised on incomes between $10,000,000 and $50,000,000 to make up the difference.

Ford to Make Truck to Sell at $1,000

New Model, 3½ Ton, in Production in June—To Cut Tractor Price

NEW YORK, Dec. 15—Persistent and apparently authoritative reports have been heard in truck circles here this week to the effect that Henry Ford has completed experimental work on a 3½-ton truck which will be sold either at $1,000 or $1,200. It is understood production will start some time next year, perhaps as early as June.

There also are what seem like well-founded reports that Ford will make material reductions next year in the prices of his touring car and tractor. There is said to be little probability of Ford putting a new passenger car on the market in the near future, although considerable experimental work has been done along this line.

Officials Decline Comment

DETROIT, Dec. 16—Officials of the Ford Motor Co. refuse either to affirm or deny reports that a 3½-ton truck will be put on the market soon or that further price cuts are in contemplation.

Testimony Is Taken In Tire Price Probe

AKRON, Dec. 15—Witnesses are giving evidence at Cleveland this week in an investigation instituted by the United States Department of Justice to determine whether or not there has been collusion among the leading tire manufacturing companies in fixing prices. The investigation has been under way for the past six months, and agents of Attorney-General Palmer are said to have found what they consider sufficient evidence to warrant action. Numerous witnesses have gone to Cleveland from Akron and other cities. Unofficially, the tire companies assert emphatically that they never have entered into combinations to control prices.

OVERLAND PASSES DIVIDEND

NEW YORK, Dec. 15—Directors of the Willys-Overland Co. decided to-day to pass the regular quarterly dividend of 1¾ per cent on the preferred stock. The action taken was to conserve cash, it was said, and the dividend for the full year has been earned several times over. This action by the directors already had been discounted. The annual report of the company shows assets on Nov. 30 to total $125,000,000. Of these approximately $4,500,000 consists of cash. Current liabilities in the fiscal year were reduced $18,000,000 to $26,750,000.

INDUSTRIAL NOTES

Ladish Drop Forge Co., Cudahy, a suburb of Milwaukee, and regarded as one of the largest producers of automotive forgings in the West, has suspended operations pending a readjustment of the business situation. Frank Ladish, secretary and treasurer of the company, expressed the hope that conditions will improve sufficiently by Jan. 1 to enable it to resume production on at least a partial scale.

Federal Rubber Co., Cudahy, suburb of Milwaukee, has effected a reduction in its working schedule to meet the slackened demand for tires, tubes and other rubber goods. All shops will close at 4:10, instead of 5:10 p. m., daily. The Federal is the last of the large tire concerns to reduce production, the degree of which, however, is relatively light.

International Harvester Co. plans establishment in Milwaukee, where it maintains one of its principal plants, of a five-story warehouse and assembling building, 100 x 150 ft., for the gas engine, tractor and truck departments of the Milwaukee works. The first unit will be erected at once, the remainder being planned for a period of two years.

Master Self-Locking Differential Mfg. Co., which was incorporated in October with $250,000 capital by a number of Wisconsin engineers, has selected Green Bay, Wis., as the permanent location of the industry. A one-story fireproof machine shop, 60 x 100 ft., is being erected and is to be equipped ready for operations on Jan. 1.

Bay City Automobile Body Co., Bay City, Mich., has completed work on six of the 80 government trucks shipped here recently for reconstruction for use in mail service. The trucks were built by the Denby Truck Co. for the government to be used in overseas service during the war.

Powerton Tire Corp., organized in Buffalo in 1917, has just completed its new plant in Rochester. Up to last year the Powerton tires were manufactured in Muskegon, Mich., but in order to have the factory near the main office in Buffalo it was decided to locate in Rochester.

Tiger Tire & Rubber Co., Ltd., expects to begin the manufacture of automobile tires and tubes at Belleville, Ont., early this month. H. H. Hastings is general manager of the company. The capitalization is $2,000,000.

Grand Rapids Tire & Rubber Co. has completed one-third of its plant and will start production of about 200 cord tires daily. When the entire plant is completed the output will be about 800 daily.

Waltham Motors Corp. has purchased the business of the Victor Motor Truck & Trailer Co., Chicago. It will discontinue the Victor truck, but will make a 1½-ton truck under the trade name Waltham.

Adrian Tractor Co., Adrian, Mich., has bought an eight-acre site on the D. T. & I. tracks in the southeast portion of the city. Plans of the company for building operations have not been announced.

White Mfg. Co. has been incorporated at Goshen, Ind., and has purchased the Alford Motor & Machine Co. and the Goshen Motor Works. A general manufacturing business will be conducted.

Devices Industry, Inc., Oshkosh, Wis., has completed its new plant and will largely increase its production of a patented "free service" air pump for garage and curb installation.

B-J Steam-Gas Generator Co., Lowell, Mich., has broken ground for a foundry and factory that will employ 200 men. The company has offices in Grand Rapids.

American Bosch Magneto Corp. has reduced production for December to 7000, as compared with 15,000 in November and the peak of 44,000 in July.

Grand Rapids Malleable Co., Fuller Junction, Mich., is building a coal pulverizing plant, 35 by 65 ft. and 50 ft. high, at an expenditure of $100,000.

Ideal Foundry Co., Grand Rapids, Mich., has let a contract for construction of an addition to its plant to permit the installation of 12 brass furnaces.

Waukesha Motor Co., Waukesha, Wis., is purchasing additional machine tool and other production equipment estimated to cost more than $100,000.

Cumberland Tire & Rubber Co., Louisville, Ky., has completed its textile and tire factories and is now ready to begin production.

Auto-Lite Co., Toledo, has suspended work until after the first of the year, throwing 450 workers out of employment temporarily.

Neville Steering Wheel & Mfg. Co., Detroit, has moved to Wayne, Mich., where it will have tripled manufacturing facilities.

Sinclair Foreclosure Deferred Until April

SPRINGFIELD, MASS., Dec. 11—Charles Margerum of Hartford, Conn., has been appointed by Referee in Bankruptcy C. W. Bosworth as trustee in bankruptcy of the Sinclair Motors Corp. with bonds set at $25,000. The liabilities of the corporation are stated to be $547,958.26 and the total assets $1,740,-520.72. The hearing yesterday was largely attended, there being a large number of workingmen with small claims present. The petition in bankruptcy was filed Oct. 1 and later the corporation was adjudged to be in bankruptcy by the United States Court in Boston.

The hearing also represented the first meeting of the Sinclair creditors, who, after the appointment of trustee, adjourned to discuss the situation. It was the consensus of the creditors present, presided over by Attorney E. H. Brewster, that the Sinclair corporation should be given a reasonable opportunity to get back on its feet. With this end in view it was decided to have the trustee, as far as he is legally empowered to act, ask the Knox Motor Works not to foreclose a mortgage on the Sinclair plant, procedure scheduled for Dec. 20, and the creditors allowed the Sinclair people an extension to April 21, for the purpose of bringing about an adjustment of all difficulties.

FULTON BUYS CANADIAN SITE

WELLAND, ONT., Dec. 11—Fulton Motors, Ltd., of Farmingdale, N. Y., decided this week to locate its Canadian plant here. The plant and property of the Canadian Automatic Transportation Co. has been secured by the motor truck concern. The site consists of 4½ acres, and additional buildings will be erected. Machinery has already been shipped to the Welland plant.

METAL MARKETS

A MORE cheerful tone is beginning to make itself felt in the metal markets. Following the upheaval brought about by the first genuine movement toward deflation, values are beginning to steady, and, while here and there, as for instance in pig iron prices, some ironing out of unnatural bulges remains to be done, a smoother and more dependable course appears to be opening up for the purchasing agent. Somewhat of an innovation appears to have been inaugurated by the Ford Motor Co., which is reported to be supplying automotive foundries working on castings for Ford cars and tractors with foundry pig at as low as $31 and malleable at $32, levels about 15 per cent lower than those quoted by the sales agents for merchant furnaces. The latter quotations, however, must still be considered as strictly nominal. In the finished steel market the outstanding feature from an automotive point of view is that the Corporation's prices for sheets have become the maximum. It is only natural that now there shoud be considerable speculation as to the probable future of independents' prices. If there continues to be a sharp deficiency of demand—a contingency that must be figured with for at least the first quarter of the new year—it is supposed that intensive competition for what business is available will lead to cuts under the Corporation's prices. These cuts, if they ensue, will, however, vary considerably between different products, depending entirely upon the particular situation in each product. Moreover, the opinion of unbiased market observers inclines to the belief that these cuts will, at best, be slight, for the following reasons: In the first place, in common with all other industries, steel makers are confident that the present period of recession in the demand is only temporary and that the late spring will witness a resumption of at least 80 per cent operations. The second consideration is that now the time has come when the industry will reap the full benefit of the stabilizing value of the Corporation's price schedule adhered to by the chief interest since early last year. From the independents' point of view, the Corporation's levels did impose certain restrictions upon them during the summer flurry, even though premiums soared, and now they would be cutting their nose to spite their face did they ignore the psychological fact that the consumer, who for many months was unable to obtain steel at the Corporation's prices, has come to look upon the latter as a FAIR price. So, why slash them more than absolutely necessary?

Pig Iron—Automotive foundries operating in the Detroit district have been offered foundry, silicon 1.75 to 2.25, at $36, Detroit furnace. The seller of practically all the merchant iron produced in the Chicago district, quotes $38, Chicago furnace, for the same grade. The market appears to continue in a state of flux.

Steel—A Corporation subsidiary is reported to have quoted cold rolled strip steel at 6.25c., base; the market, on the whole, ranging, however, up to 6.75c. Hot rolled strip is quotable at 4c. Sheets have settled on the Corporation's price basis.

Aluminum—Sellers in the "outside" market ask about 1c. more for first quarter 1921 maturities than spot metal is obtainable for. The sole American producer adheres to previous contract price. The undertone of the market displays a firmer tendency.

Copper—Save for occasional spells of temporary weakness incidental to reconvalescence, the market is in good shape, drastic cuts in production acting as additional support. Those who bought at 13½c. have nothing to be sorry for.

Automotive Financial Notes

Kearney & Trecker Co., Milwaukee, has reincorporated under the laws of Wisconsin as the Kearney & Trecker Corp., with an authorized capitalization of $2,500,000. The company was founded in 1898 by E. J. Kearney and Theodore Trecker in a small shop. It now occupies a large tract in West Allis, the manufacturing suburb of Milwaukee. Its principal owners also hold the major share in the LeRoi Co., manufacturing passenger, commercial car and tractor engines at Milwaukee.

Stromberg Carbureter Co. of America, Inc., for the three months ended Sept. 30, reports surplus after charges and Federal taxes of $87,603, equal to $1.17 a share on the 75,000 shares of capital stock. This compares with a surplus of $202,478, or $2.72 a share in the preceding quarter, and of $102,342 or $2.04 a share in the September, 1919, quarter. A quarterly dividend of 50 cents a share will be paid Jan. 3. The company has been paying $1 a share each quarter.

Meigs-Powell Co., Milwaukee, manufacturer of machine and manual tools, gages, micrometers, etc., has increased its capital stock from $50,000 to the equivalent of $150,000 and enlarged its directorate from three members to five. Several months ago the company moved into a three-story shop building of its own, and it has installed much new equipment to increase production.

Perfection Tire & Rubber Co., through Chairman of the Board Robinson, declares itself free of entanglements or troubles which have overcome the Industrial Securities Co., all contractural and fiscal relations having been severed at the last annual meeting in February. The company will need $1,000,000 in new capital annually for five years to meet production requirements.

Stinson Tractor Co., Minneapolis, is marketing a new issue of $250,000 of capital stock to finance important enlargement of the plant. Superior capital will invest about $75,000 through the local Civic and Commerce Association. The remainder is being subscribed by outside interests.

Wisconsin Electric Welder Co. has been incorporated at Milwaukee with a capital stock of $150,000 by E. H. Mills, L. U. Poppe and C. F. Runge. It is chartered to manufacture and deal in machinery of all kinds, particularly equipment for welding and cutting metals by electricity.

Detroit, Toledo & Ironton Railroad reports gross earnings of $598,054 in October, compared with $430,830 in Oct., 1919. Net operating deficit after taxes was $156,284, compared with net operating income of $5,843 in the same month last year.

Gardner Turbine Muffler Co. has been organized at Traverse City, Mich., with David Stark, president and general manager, and G. W. Garner, vice-president and superintendent. The concern is capitalized at $50,000 paid in and will begin production immediately.

Times Square Auto Supply Co. has declared the usual quarterly dividend of 62½ cents a share payable Jan. 27 in 8 per cent scrip dated Jan. 27 and due Jan. 27, 1922. The scrip is convertible at maturity into stock at $20 a share.

Kelly-Springfield Tire Co. has renewed the lease on its building in New York for twenty years at a rental aggregating $1,000,000. The plant at Cumberland, Md., costing $10,000,000, will soon be in production.

Port Houston Tire & Rubber Co., capitalized at $1,000,000, has acquired the Universal Tire & Rubber Assn. at Houston and will resume operation of the plant early next year. Manufacturing facilities will be increased.

Hartford Automotive Parts Co. has increased its capital stock from $1,500,000 to $2,000,000 through the issuance of 10,000 additional shares (par $50).

Hupp Motor Car Corp. has declared a quarterly dividend of 1¾ per cent on the 7 per cent cumulative preferred stock, payable Jan. 2.

Delion Tire & Rubber Co. has declared a regular quarterly dividend of 2 per cent on the preferred stock, payable Jan. 2.

Ajax Rubber Co. paid a quarterly dividend of $1 Dec. 15.

G. M. C. Considers Change in Stock Dividends

NEW YORK, Dec. 13—It is expected that when the directors of the General Motors Corp. meet for dividend action later this month they will declare only the 25 cents a share quarterly on the common stock and discontinue the payment of one-fortieth of a share in stock on the common which was begun this year. The financial interests now in control of the company believe stock dividends are unwise at present because most of the shares thus distributed are thrown upon the market and tend to keep down the quoted value of the stock. A quarterly dividend of one-fortieth of a share in stock on the common capitalization of 20,000,000 shares would amount in a year to 2,000,000 shares, or 10 per cent. It is felt stockholders would derive greater benefit from a lump stock dividend every two or three years.

Since the retirement of W. C. Durant and the assumption of control by the DuPont and Morgan interests there has been less talk of refinancing for General Motors and there is little probability of any steps in this direction in the near future. There has been talk of $50,000,000 as the sum needed. While there has been a heavy shrinkage in the company's business, as has been the case with all automobile companies, it is in a strong financial position and its inventory has been greatly reduced.

New Departure Upheld in Suit on Patents

NEW HAVEN, Dec. 13—Federal Judge Edward L. Garvin has filed a decision in favor of the New Departure Mfg. Co. of Bristol in its suit against the Rockwell-Drake Corp., Marlin-Rockwell Corp. and Albert F. Rockwell, former president of the New Departure company. The decree provides:

"1. That the court enjoin the defendants from further manufacture, using or selling those double-row ball bearings which infringe New Departure patents.

"2. That the court order an accounting and give to the New Departure Mfg. Co. the profits which that accounting shows that the defendants have made from the infringement, and also give to the plaintiff the damages the plaintiff has suffered from that infringement.

"3. That the court order the defendants to pay the costs of the suit."

Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, Dec. 16—The approach of the year-end and mid-month settlements has tended apparently to keep money rates firm during the last week. In spite of further liquidations in the stock market, which carried railroads down with the general list, call money remained at 7 per cent throughout the week, as compared with a ruling rate of 7 per cent and a range of 6 per cent to 7 per cent a week ago.

Time money was slightly firmer last week, with quotations practically nominal, however, at 7¼ per cent to 7½ per cent for 60 to 90 day paper secured by regular mixed collateral, as against 7¼ per cent the previous week. Four, five and six month paper rates were at 7 per cent to 7¼ per cent, as compared with 6½ per cent a week earlier. Rates for loans secured by all industrial collateral were quoted at about ¼ per cent, as compared with 6½ per cent a week earlier. Rates for loans secured by all industrial collateral were quoted at about ¼ per cent above the rates on mixed collateral loans.

The most noteworthy feature of the week-end statement of the New York Associated Banks was the $43,668,000 increase in net demand deposits. Loans declined $619,000 and net time deposits $11,213,000. Excess reserves over legal requirements at $11,247,910, marking a decline of $10,733,130, were practically cut in half, a result, in part, of a reduction in reserve deposits at the Reserve Bank.

The New York Federal Reserve Bank showed an improved reserve condition. Total gold reserves last week increased $10,676,694 over the previous week, and total cash reserves increased $12,147,901. Total bills on hand declined $41,420,202. Net deposits were down $8,330,140, and total earning assets declined $30,955,557. Federal Reserve notes in actual circulation at this center declined $9,800,290.

STOUGHTON PLANT REOPENS

STOUGHTON, WIS., Dec. 13—After being virtually closed down for more than six weeks, the Stoughton (Wis.) branch works of the Moline Plow Co. has resumed operations with a force of between 40 and 50 per cent. New business is being received in fair volume and it is hoped to increase production steadily. The foundry, machine and forge shops and manure spreader department are now in operation.

Men of the Industry

Ethan Viall, editor-in-chief of the *American Machinist,* and for ten years a member of its staff, has resigned to become a partner in the firm of T. W. Minton & Co., Barbourville, Ky., the largest producer of hickory dimension stock in the country. Previous to joining the staff of the *American Machinist* Viall was for three years associate editor of *Machinery,* and before that was for fourteen years foreman and superintendent in several of the largest specialty plants in the Middle West. He is author of Broaches and Broaching, Gas Torch and Thermit Welding, Electric Welding and other engineering books. He is a member of the Society of Automotive Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers.

W. H. Williams, former general sales manager for the Hart-Parr Co. and for the past year sales manager of the Eagle Mfg. Co., has joined the sales force of the United States Tractor & Machinery Co., Menasha, Wis. His headquarters will be in Minneapolis. M. R. Showalter and C. W. Lucey have been made branch managers in Kansas City and Springfield, Ill., respectively.

Herbert Chase, formerly treasurer and assistant secretary of the Society of Automotive Engineers, has joined the editorial staff of AUTOMOTIVE INDUSTRIES. He has had extensive experience in research and other engineering work with the Automobile Club of America and in editorial work in connection with S. A. E. publications.

A. O. Williams has been appointed secretary of the Automotive Association of the Cleveland Chamber of Commerce. He has had considerable experience in selling in both commercial and passenger car lines. He is to devote his entire time to the secretaryship and will succeed Clifford Brown.

John J. Kroha, formerly with the paint engineering department of the Patton Paint Co., Milwaukee, has joined the forces of the W. E. Seymour Mfg. Corp., Milwaukee, makers of pistons and piston rings, as secretary and sales manager.

Governor Alfred E. Smith of New York will become chairman of the board of the United States Trucking Corp., New York, effective Jan. 3, 1921. Before entering politics Governor Smith had been associated with his father in a trucking business in New York.

J. L. Adams has been made manager of the Miller Rubber Co. branch at Houston, Texas. L. Crain, who has been a salesman out of Houston, has been appointed manager of the San Antonio branch.

Capt. Eddie V. Rickenbacker, American Ace and former racing driver, has been named vice-president and general manager of the California company, which will handle Sheridan distribution in that State.

W. J. Foster, formerly assistant truck sales manager of the New York Packard branch, has been named transportation engineer and assistant to the truck sales manager of Hare's Motors.

Arthur J. McElhone will join the organization of the Byron G. Moon Co., Inc., Troy, N. Y., in January as an account executive specializing in the automotive and allied industries.

P. V. Burwell has been made assistant advertising manager of the Black & Decker Mfg. Co., Baltimore. G. W. Brogan is head of the department.

C. W. Couch, formerly sales manager of the Ford-Clark Co., has formed a selling organization under the name of C. W. Couch & Co., with offices in Cleveland.

R. J. Fitness has been appointed consulting engineer and manager of the Detroit business of the Intercolonial Export Agencies, Ltd., of Montreal.

Earl W. McGooking has rejoined the W. R. Johnston Mfg. Co., Chicago, as factory representative in Michigan and Ohio.

H. E. Crocker has been made Boston district manager for the United States Tire Co.

Chapin and Raskob on Finance Committee

CHICAGO, Dec. 13—The automotive industry is well represented on the committee appointed to supervise the formation of the proposed Foreign Trade Financing Corp., which will have a capital of $100,000,000 and a capacity for carrying $1,000,000,000 worth of business on its books. The committee is headed by John McHugh of New York and includes some of the most prominent bankers and financiers of the United States. The automotive representatives are Roy D. Chapin of Detroit, president of the Hudson Motor Car Co., and John S. Raskob, a director of the General Motors Corp., and a leader in the councils of the Du Pont family. The committee was named at a conference of more than 200 bankers in this city. The committee will immediately begin gathering subscriptions to provide for the preliminary expenses of the organization.

FALLS MOTORS NAMES NEW HEAD

MILWAUKEE, Dec. 11—A number of changes in the official personnel of the Falls Motors Corp., Sheboygan Falls, have been announced. H. W. Dilden, son of the president of the Fort Dearborn National Bank of Chicago, has been elected president. E. W. Ramsdell of Chicago continues as vice-president. Henry Landwehr of Sheboygan becomes treasurer to succeed Konrad Schreier, Jr., who will enter another business in Chicago on Dec. 1. Landwehr has been auditor and is succeeded in that position by T. C. Widder.

ANTIGO BUYS MURRAY-MYLREA

ANTIGO, WIS., Dec. 13—Instead of building a new plant, as originally intended, the Antigo Tractor Co., organized several months ago at Antigo, Wis., with an authorized capitalization of $500,000, has acquired the foundry and machine shop of the Murray-Mylrea Co. at Antigo, taking possession at once. The Murray-Mylrea Co. manufactured logging and sawmill machinery, but for some time has been building a limited number of tractors for the new company under contract. The tractor design employs a quadruple drive and will be known as the "Four Wheel Pull" tractor. D. S. Stewart, a pioneer in automotive engineering in the Middle West and one of the first builders of a practical tractor, is chief engineer and a director of the Antigo company. The other officers are: President, Charles W. Fish; vice-presidents, L. P. Tradewell and William H. Wolpert; secretary, E. A. Yahr; treasurer, Ernest Hirt; directors, John Manser, J. R. McQuillan, E. P. Faust. The enterprise has been financed exclusively by loggers, lumber manufacturers and other business men of Antigo and vicinity.

Reynolds Creditors to Determine Action

MT. CLEMENS, MICH., Dec. 10—Hearing on the petition for the appointment of a permanent receiver of the Reynolds Motor Truck Co. of this city will be held in the Circuit Court here Dec. 20. A decision will be reached at that time, also, whether or not to continue the manufacturing of trucks in order to utilize the assets of the company to the best interests of the creditors. The present temporary receiver is Charles J. Reinold.

Since the meeting of the creditors in October, A. A. Lehr, formerly the vice-president and general manager of the company, submitted to the directors a proposition which he had received to buy up all the outstanding stock at full par value on the preferred stock and 15 per cent of the par value on common stock. This proposition it is understood also carried with it an agreement to pay off all claims against the corporation at once at 100 cents on the dollar, but it is said that this offer has been definitely refused by the directors.

The total liabilities are more than $135,000 and the assets will not exceed $165,000.

DAYTON RECEIVER NAMED

DAYTON, OHIO, Dec. 13—H. J. Oakes has been appointed temporary receiver for the Dayton Metal Body Co. and has been authorized to continue the business. The company manufactures metal bodies for Ford cars and when orders now on hand are completed, it is believed it will be possible to lift the receivership.

DUNLOP DIRECTORS RETIRE

NEW YORK, Dec. 13—A cable dispatch from London says that Messrs. White and Ormrod, directors of the Beecham Trust Co., have retired from the board of the Dunlop Rubber Co. They have been responsible for the financial policy of the company in recent years. The market for Dunlop stock has been very weak in London for some time past.

CLINTON W. ATWOOD DIES

DANIELSON, CONN., Dec. 10—Clinton W. Atwood, president and treasurer of the Williamsville Buff Mfg. Co., died Dec. 1.

Calendar

SHOWS

Dec. 18-24—New Orleans, Annual Automobile Show, New Orleans Automobile Dealers Ass'n, Abbott Bldg.

Jan. 3-8 — New York, Motor Truck Show, Motor Truck Ass'n of America, Twelfth Regiment Armory.

Jan. 8-15—New York. National Passenger Car Show, Grand Central Palace. Auspices of N.A.C.C.

Jan. 10-17—Portland, Ore., Annual Automobile Show, Automobile Dealers' Ass'n. Municipal Auditorium, M. O. Wilkins, Mgr.

Jan. 15-29—Philadelphia, Annual Automobile Show, Philadelphia Automobile Trade Ass'n.

Jan. 17-23—Milwaukee. Annual Automobile Show, Milwaukee Automotive Dealers' Ass'n.

Jan. 22-27—San Francisco, Second Annual Pacific Coast Automotive Equipment Exposition, Auditorium.

Jan. 22-29—Baltimore, Annual Automobile Show, Baltimore, Automobile Dealers' Ass'n, 5th Regiment Armory, J. C. O'Brien, Mgr.

Jan. 22-29—Cleveland, Annual Passenger Car Show, Cleveland Mfr's & Dealers' Ass'n, Wigmore Coliseum.

Jan. 22-29—Montreal, Annual Automobile Show, Montreal Automobile Trade Ass'n, Motordrome Bldg.

Jan. 29-Feb. 4 — Chicago, National Passenger Car Show, Coliseum, Auspices of N.A.C.C.

Feb. 5-12—Minneapolis, Annual Automobile Show, Minneapolis Automobile Trade Ass'n.

Feb. 6-12—Columbus, National Tractor Show, Columbus Tractor & Implement Club, Ohio State Fair Grounds.

Feb. 12-19—Hartford, Conn., Annual Automobile Show, Hartford Automobile Dealers Ass'n. Armory, Arthur Fifoot, Mgr.

Feb. 12-19—Kansas City. Annual Automobile Show, Kansas City Motor Car Dealers' Ass'n.

Feb. 14-19—St. Louis, Annual Automobile Show, St. Louis Automobile M'f'rs & Dealers' Ass'n, Robt. E. Lee, Mgr.

Feb. 14-19—Winnipeg, Western Canada Automotive Equipment Show.

Feb. 18-28—San Bernardino, Cal., National Orange Show, Fred M. Renfro, Mgr.

Feb. 19-26—San Francisco, Fifth Annual Pacific Automobile Show, Exposition Auditorium, George Mahlgreen, Mgr.

Feb. 21-26—Louisville, Annual Automobile Show, Louisville Automobile Dealers Ass'n, First Regiment Armory, C. L. Alderson, sec'y.

Feb. 21-26—Salt Lake City, Annual Automobile Show, Intermountain Automotive Trades Ass'n, W. D. Rishal, Mgr.

Mar. 2-10—Des Moines, Annual Automobile Show, Coliseum, C. G. Van Vliet, Mgr.

Mar. 5-12—Brooklyn, Annual Automobile Show, Brooklyn Motor Vehicle Dealers' Ass'n, 23d Regiment Armory, George C. Lewis, chairman.

Mar. 7-12—Syracuse, N. Y., Annual Automobile Show, Syracuse Automobile Dealers Ass'n, Armory, Howard H. Smith, Mgr.

Mar. 7-12—Indianapolis, Annual Automobile Show, Indianapolis Automotive Trade Ass'n, Automobile Bldg., State Fair Grounds, John Orman, Mgr.

Mar. 12-19—Boston, Annual Automobile Show, Mechanics Bldg. and South Armory.

Mar. 14-19—Omaha, Annual Automobile Show, Omaha Automobile Trade Ass'n, Inc., Omaha Auditorium, C. G. Powell, Mgr.

April 4-9—Seattle, Annual Automobile Show. Seattle Motor Car Dealers' Ass'n, Arena Hippodrome.

April— Chattanooga, Tenn., Spring Automobile Show, Chattanooga Automotive Trade Ass'n, Sunday Tabernacle, C. A. Noone, sec'y.

FOREIGN SHOWS

Jan. 7 — Sydney, Australian Motor Show.

Jan. 22-29 — Colombo, Ceylon Motor Show.

Feb. 7—Delhi, India, Delhi Motor Show.

Mar. 23-28—Witwatersrand Agricultural Show including machinery and motors sections.

CONVENTIONS

Dec. 28-30 — Chicago, Annual Meeting American Society of Agricultural Engineers.

Jan. 7—New York, Advertising Managers Council, Motor & Accessory Manufacturers' Ass'n.

Jan. 11-13—S. A. E. Annual Meeting, New York City.

Feb. 2-4—Chicago, First Annual Meeting, Automotive Electric Service Assn. Hotel La Salle.

May 4-7 — Cleveland, National Foreign Trade Council.

Oct. 12-14, 1921—Chicago, Twenty-Eighth Annual Convention National Implement & Vehicle Ass'n.

N. A. C. C. Gets Rates at Hotels for Shows

NEW YORK, Dec. 14—The National Automobile Chamber of Commerce has sent letters to all the hotels in New York in an effort to get them on record as to their rates for automobile show week in this city. It has been learned that some of the larger hotels have contemplated a material increase in rates for that period. The largest in the city has indicated an intention of charging for a full week if the room is occupied for only two or three days and charging double rates for one in a room. Others of the larger hotels, however, have agreed to adhere to the regular schedules.

The N. A. C. C. has invited 25,000 automobile dealers from all parts of the country to be its guests for the show and it is not proposed to have them exploited by the hotels while they are here if it can be avoided. There is every reason to believe that the campaign now being conducted will result in the establishing of reasonable hotel rates for the week.

VIENNA WANTS FORD PLANT

DETROIT, Dec. 11—Austrian manufacturers and leading business men spent Friday and Saturday in conference with officials of the Ford Motor Co. urging Vienna as a distribution center for Ford products as well as other American goods. They urged the necessity of securing American products to supplement the limited output in their own country in order to build up business to care for the thousands of destitute persons through the empire. The delegation was headed by G. N. Hanald, secretary of the Motor Car Association of Austria, and A. Pross Bussing, head of one of Austria's largest companies.

Deere Cuts Production on Farm Implements

MOLINE, ILL., Dec. 13—Deere & Co. will curtail production during the winter months, due to the lessening of demand for tractors and other agricultural implements and power farming machinery. There has been no general rule followed but each situation has been handled in accordance with its own merits. In some cases, there has been a reduction in the hours per week from fifty to forty. In other cases, a small reduction in force was found advisable. In making any reduction, care was exercised in giving the old and regular employees, married men and men owning homes, the preference.

PREST-O-LITE CLEARED

WASHINGTON, Dec. 13—Dismissal of its complaint of unfair competition against the Prest-O-Lite Co., Inc., of Indianapolis, was announced by the Federal Trade Commission. This company, which manufactures and sells acetylene in steel containers, leased thousands of containers for automobiles in the early days of the industry.

Eastern States to Keep Main Highways Open

WASHINGTON, Dec. 13—Thorough study of the snow-removal problem in the Eastern States conducted by J. L. Harrison, senior highway engineer, Bureau of Public Roads, shows that every effort will be made to keep the main highways open this winter to such an extent that motor trucks may continue service.

The maintenance departments of the various States will be charged with the responsibility of keeping the roads clear of snow though there are instances where the local authorities have promised to handle the problem effectively. According to the Federal engineer there are two distinct groups of activities, (1) the removal of snow from the highways and (2) preventive methods tending to keep it from blowing into the highways in objectionable quantity.

CORRECTION

The statement was made in AUTOMOTIVE INDUSTRIES last week, in an item announcing that the Ward-La France Truck Corp. had increased its capital to $10,300,000, that the truck corporation was a subsidiary of the American La France Fire Engine Co. This was an error for the reason that the Ward-La France company has no connection whatever with the American La France Fire Engine Co. The latter has not done and does not contemplate any new financing.